

Panda™ Warmer Family and Giraffe™ Warmer Service Manual

Panda™ iRes Warmer, Panda™ Freestanding Warmer, Panda™ Wall-Mount Warmer

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Revision T
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Masimo

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Masimo Patents: www.masimo.com/patents.htm

Revision history

Rev	Revision date	Description
T	2022	Add cleaning and disinfection for tubing management arm and updated specification of procedure light.
S	2021	Added reusable temperature probe to Accessories section.
R	2020	Service manual conversion to content management system and incorporation of addenda – Class A

Language Policy

DOC0371395 - Global Language Procedure

ПРЕДУПРЕЖДЕНИЕ (BG)	<p>Това упътване за работа е налично само на английски език.</p> <ul style="list-style-type: none"> Ако доставчикът на услугата на клиента изиска друг език, задължение на клиента е да осигури превод. Не използвайте оборудването, преди да сте се консултирали и разбрали упътването за работа. Неспазването на това предупреждение може да доведе до нараняване на доставчика на услугата, оператора или пациента в резултат на токов удар, механична или друга опасност.
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UPOZORENJE (HR)	<p>Ovaj servisni priručnik dostupan je na engleskom jeziku.</p> <ul style="list-style-type: none"> • Ako davatelj usluge klijenta treba neki drugi jezik, klijent je dužan osigurati prijevod. • Ne pokušavajte servisirati opremu ako niste u potpunosti pročitali i razumjeli ovaj servisni priručnik. • Zanimarite li ovo upozorenje, može doći do ozljede davatelja usluge, operatera ili pacijenta uslijed strujnog udara, mehaničkih ili drugih rizika.
VÝSTRAHA (CS)	<p>Tento provozní návod existuje pouze v anglickém jazyce.</p> <ul style="list-style-type: none"> • V případě, že externí služba zákazníkům potřebuje návod v jiném jazyce, je zajištění překladu do odpovídajícího jazyka úkolem zákazníka. • Nesnažte se o údržbu tohoto zařízení, aniž byste si přečetli tento provozní návod a pochopili jeho obsah. • V případě nedodržování této výstrahy může dojít k poranění pracovníka prodejního servisu, obslužného personálu nebo pacientů vlivem elektrického proudu, respektive vlivem mechanických či jiných rizik.
ADVARSEL (DA)	<p>Denne servicemanual findes kun på engelsk.</p> <ul style="list-style-type: none"> • Hvis en kundes tekniker har brug for et andet sprog end engelsk, er det kundens ansvar at sørge for oversættelse. • Forsøg ikke at servicere udstyret uden at læse og forstå denne servicemanual. • Manglende overholdelse af denne advarsel kan medføre skade på grund af elektrisk stød, mekanisk eller anden fare for teknikeren, operatøren eller patienten.
WAAR-SCHUWING (NL)	<p>Deze onderhoudshandleiding is enkel in het Engels verkrijgbaar.</p> <ul style="list-style-type: none"> • Als het onderhoudspersoneel een andere taal vereist, dan is de klant verantwoordelijk voor de vertaling ervan. • Probeer de apparatuur niet te onderhouden alvorens deze onderhoudshandleiding werd geraadpleegd en begrepen is. • Indien deze waarschuwing niet wordt opgevolgd, zou het onderhoudspersoneel, de operator of een patiënt gewond kunnen raken als gevolg van een elektrische schok, mechanische of andere gevaren.
WARNING (EN)	<p>This service manual is available in English only.</p> <ul style="list-style-type: none"> • If a customer's service provider requires a language other than English, it is the customer's responsibility to provide translation services. • Do not attempt to service the equipment unless this service manual has been consulted and is understood. • Failure to heed this warning may result in injury to the service provider, operator or patient from electric shock, mechanical or other hazards.
HOIATUS (ET)	<p>See teenindusjuhend on saadaval ainult inglise keeles.</p> <ul style="list-style-type: none"> • Kui klienditeeninduse osutaja nõuab juhendit inglise keelest erinevas keeles, vastutab klient tõlke-teenuse osutamise eest. • Ärge üritage seadmeid teenindada enne eelnevalt käesoleva teenindusjuhendiga tutvumist ja sellest aru saamist. • Käesoleva hoiatuse eiramine võib põhjustada teenuseosutaja, operaatori või patsiendi vigastamist elektrilöögi, mehaanilise või muu ohu tagajärjel.

VAROITUS (FI)	<p>Tämä huolto-ohje on saatavilla vain englanniksi.</p> <ul style="list-style-type: none"> • Jos asiakkaan huoltohenkilöstö vaatii muuta kuin englanninkielistä materiaalia, tarvittavan käännöksen hankkiminen on asiakkaan vastuulla. • Älä yritä korjata laitteistoa ennen kuin olet varmasti lukenut ja ymmärtänyt tämän huolto-ohjeen. • Mikäli tätä varoitusta ei noudateta, seurauksena voi olla huoltohenkilöstön, laitteiston käyttäjän tai potilaan vahingoittuminen sähköiskun, mekaanisen vian tai muun vaaratilanteen vuoksi.
ATTENTION (FR)	<p>Ce manuel d'installation et de maintenance est disponible uniquement en anglais.</p> <ul style="list-style-type: none"> • Si le technicien d'un client a besoin de ce manuel dans une langue autre que l'anglais, il incombe au client de le faire traduire. • Ne pas tenter d'intervenir sur les équipements tant que ce manuel d'installation et de maintenance n'a pas été consulté et compris. • Le non-respect de cet avertissement peut entraîner chez le technicien, l'opérateur ou le patient des blessures dues à des dangers électriques, mécaniques ou autres.
WARNUNG (DE)	<p>Diese Serviceanleitung existiert nur in englischer Sprache.</p> <ul style="list-style-type: none"> • Falls ein fremder Kundendienst eine andere Sprache benötigt, ist es Aufgabe des Kunden für eine entsprechende Übersetzung zu sorgen. • Versuchen Sie nicht diese Anlage zu warten, ohne diese Serviceanleitung gelesen und verstanden zu haben. • Wird diese Warnung nicht beachtet, so kann es zu Verletzungen des Kundendiensttechnikers, des Bedieners oder des Patienten durch Stromschläge, mechanische oder sonstige Gefahren kommen.
ΠΡΟΕΙΔΟΠΟΙ ΗΣΗ (EL)	<p>Το παρόν εγχειρίδιο σέρβις διατίθεται στα αγγλικά μόνο.</p> <ul style="list-style-type: none"> • Εάν το άτομο παροχής σέρβις ενός πελάτη απαιτεί το παρόν εγχειρίδιο σε γλώσσα εκτός των αγγλικών, αποτελεί ευθύνη του πελάτη να παρέχει υπηρεσίες μετάφρασης. • Μην επιχειρήσετε την εκτέλεση εργασιών σέρβις στον εξοπλισμό εκτός εάν έχετε συμβουλευτεί και έχετε κατανοήσει το παρόν εγχειρίδιο σέρβις. • Εάν δεν λάβετε υπόψη την προειδοποίηση αυτή, ενδέχεται να προκληθεί τραυματισμός στο άτομο παροχής σέρβις, στο χειριστή ή στον ασθενή από ηλεκτροπληξία, μηχανικούς ή άλλους κινδύνους.
FIGYELMEZ- TETÉS (HU)	<p>Ezen karbantartási kézikönyv kizárólag angol nyelven érhető el.</p> <ul style="list-style-type: none"> • Ha a vevő szolgáltatója angoltól eltérő nyelvre tart igényt, akkor a vevő felelőssége a fordítás elkészíttetése. • Ne próbálja elkezdeni használni a berendezést, amíg a karbantartási kézikönyvben leírtakat nem értelmezték. • Ezen figyelmeztetés figyelmen kívül hagyása a szolgáltató, működtető vagy a beteg áramütés, mechanikai vagy egyéb veszélyhelyzet miatti sérülését eredményezheti.
AÐVÖRUN (IS)	<p>Þessi þjónustuhandbók er aðeins fáanleg á ensku.</p> <ul style="list-style-type: none"> • Ef að þjónustuveitandi viðskiptamanns þarfnast annas tungumáls en ensku, er það skylda viðskiptamanns að skaffa tungumálþjónustu. • Reynið ekki að afgreiða tækið nema að þessi þjónustuhandbók hefur verið skoðuð og skilin. • Brot á sinna þessari aðvörun getur leitt til meiðsla á þjónustuveitanda, stjórnanda eða sjúklings frá raflosti, vélrænu eða öðrum áhættum.
AVVERTENZA (IT)	<p>Il presente manuale di manutenzione è disponibile soltanto in lingua inglese.</p> <ul style="list-style-type: none"> • Se un addetto alla manutenzione richiede il manuale in una lingua diversa, il cliente è tenuto a provvedere direttamente alla traduzione. • Procedere alla manutenzione dell'apparecchiatura solo dopo aver consultato il presente manuale ed averne compreso il contenuto. • Il mancato rispetto della presente avvertenza potrebbe causare lesioni all'addetto alla manutenzione, all'operatore o ai pazienti provocate da scosse elettriche, urti meccanici o altri rischi.

警告 (JA)	<p>このサービスマニュアルには英語版しかありません。</p> <ul style="list-style-type: none"> • サービスを担当される業者が英語以外の言語を要求される場合、翻訳作業はその業者の責任で行うものとさせていただきます。 • このサービスマニュアルを熟読し理解せずに、装置のサービスを行わないでください。 • この警告に従わない場合、サービスを担当される方、操作員あるいは患者さんが、感電や機械的又はその他の危険により負傷する可能性があります。
경고 (KO)	<p>본 서비스 매뉴얼은 영어로만 이용하실 수 있습니다.</p> <ul style="list-style-type: none"> • 고객의 서비스 제공자가 영어 이외의 언어를 요구할 경우, 번역 서비스를 제공하는 것은 고객의 책임입니다. • 본 서비스 매뉴얼을 참조하여 숙지하지 않은 이상 해당 장비를 수리하려고 시도하지 마십시오. • 본 경고 사항에 유의하지 않으면 전기 쇼크, 기계적 위험, 또는 기타 위험으로 인해 서비스 제공자, 사용자 또는 환자에게 부상을 입힐 수 있습니다.
BRĪDINĀJUMS (LV)	<p>Šī apkopes rokasgrāmata ir pieejama tikai angļu valodā.</p> <ul style="list-style-type: none"> • Ja klienta apkopes sniedzējam nepieciešama informācija citā valodā, klienta pienākums ir nodrošināt tulkojumu. • Neveiciet aprīkojuma apkopi bez apkopes rokasgrāmatas izlasīšanas un saprašanas. • Šī brīdinājuma neievērošanas rezultātā var rasties elektriskās strāvas trieciena, mehānisku vai citu faktoru izraisītu traumu risks apkopes sniedzējam, operatoram vai pacientam.
ĮSPĖJIMAS (LT)	<p>Šis eksploatavimo vadovas yra tik anglų kalba.</p> <ul style="list-style-type: none"> • Jei kliento paslaugų tiekėjas reikalauja vadovo kita kalba – ne anglų, suteikti vertimo paslaugas privalo klientas. • Nemėginkite atlikti įrangos techninės priežiūros, jei neperskaitėte ar nesupratote šio eksploatavimo vadovo. • Jei nepaisysite šio įspėjimo, galimi paslaugų tiekėjo, operatoriaus ar paciento sužalojimai dėl elektros šoko, mechaninių ar kitų pavojų.
ADVARSEL (NO)	<p>Denne servicehåndboken finnes bare på engelsk.</p> <ul style="list-style-type: none"> • Hvis kundens serviceleverandør har bruk for et annet språk, er det kundens ansvar å sørge for oversettelse. • Ikke forsøk å reparere utstyret uten at denne servicehåndboken er lest og forstått. • Manglende hensyn til denne advarselen kan føre til at serviceleverandøren, operatøren eller pasienten skades på grunn av elektrisk støt, mekaniske eller andre farer.
OSTRZEŻENIE (PL)	<p>Niniejszy podręcznik serwisowy dostępny jest jedynie w języku angielskim.</p> <ul style="list-style-type: none"> • Jeśli serwisant klienta wymaga języka innego niż angielski, zapewnienie usługi tłumaczenia jest obowiązkiem klienta. • Nie próbować serwisować urządzenia bez zapoznania się z niniejszym podręcznikiem serwisowym i zrozumienia go. • Niezastosowanie się do tego ostrzeżenia może doprowadzić do obrażeń serwisanta, operatora lub pacjenta w wyniku porażenia prądem elektrycznym, zagrożenia mechanicznego bądź innego.
ATENÇÃO (PT-BR)	<p>Este manual de assistência técnica encontra-se disponível unicamente em inglês.</p> <ul style="list-style-type: none"> • Se outro serviço de assistência técnica solicitar a tradução deste manual, caberá ao cliente fornecer os serviços de tradução. • Não tente reparar o equipamento sem ter consultado e compreendido este manual de assistência técnica. • A não observância deste aviso pode ocasionar ferimentos no técnico, operador ou paciente decorrentes de choques elétricos, mecânicos ou outros.

ATENÇÃO (PT-PT)	<p>Este manual de assistência técnica só se encontra disponível em inglês.</p> <ul style="list-style-type: none"> • Se qualquer outro serviço de assistência técnica solicitar este manual noutra idioma, é da responsabilidade do cliente fornecer os serviços de tradução. • Não tente reparar o equipamento sem ter consultado e compreendido este manual de assistência técnica. • O não cumprimento deste aviso pode colocar em perigo a segurança do técnico, do operador ou do paciente devido a choques eléctricos, mecânicos ou outros.
ATENȚIE (RO)	<p>Acest manual de service este disponibil doar în limba engleză.</p> <ul style="list-style-type: none"> • Dacă un furnizor de servicii pentru clienți necesită o altă limbă decât cea engleză, este de datoria clientului să furnizeze o traducere. • Nu încercați să reparați echipamentul decât ulterior consultării și înțelegerii acestui manual de service. • Ignorarea acestui avertisment ar putea duce la rănirea depanatorului, operatorului sau pacientului în urma pericolelor de electrocutare, mecanice sau de altă natură.
ОСТОРОЖНО! (RU)	<p>Данное руководство по техническому обслуживанию представлено только на английском языке.</p> <ul style="list-style-type: none"> • Если сервисному персоналу клиента необходимо руководство не на английском, а на каком-то другом языке, клиенту следует самостоятельно обеспечить перевод. • Перед техническим обслуживанием оборудования обязательно обратитесь к данному руководству и поймите изложенные в нем сведения. • Несоблюдение требований данного предупреждения может привести к тому, что специалист по техобслуживанию, оператор или пациент получит удар электрическим током, механическую травму или другое повреждение.
UPOZORENJE (SR)	<p>Ovo servisno uputstvo je dostupno samo na engleskom jeziku.</p> <ul style="list-style-type: none"> • Ako klijentov serviser zahteva neki drugi jezik, klijent je dužan da obezbedi prevodilačke usluge. • Ne pokušavajte da opravite uređaj ako niste pročitali i razumeli ovo servisno uputstvo. • Zanemarivanje ovog upozorenja može dovesti do povređivanja servisera, rukovaoca ili pacijenta usled strujnog udara ili mehaničkih i drugih opasnosti.
UPOZORNENIE (SK)	<p>Tento návod na obsluhu je k dispozícii len v angličtine.</p> <ul style="list-style-type: none"> • Ak zákazník poskytovateľ služieb vyžaduje iný jazyk ako angličtinu, poskytnutie prekladateľských služieb je zodpovednosťou zákazníka. • Nepokúšajte sa o obsluhu zariadenia, kým si neprečítate návod na obsluhu a neporozumiete mu. • Zanedbanie tohto upozornenia môže spôsobiť zranenie poskytovateľa služieb, obsluhujúcej osoby alebo pacienta elektrickým prúdom, mechanické alebo iné ohrozenie.
ATENCIÓN (ES)	<p>Este manual de servicio sólo existe en inglés.</p> <ul style="list-style-type: none"> • Si el encargado de mantenimiento de un cliente necesita un idioma que no sea el inglés, el cliente deberá encargarse de la traducción del manual. • No se deberá dar servicio técnico al equipo, sin haber consultado y comprendido este manual de servicio. • La no observancia del presente aviso puede dar lugar a que el proveedor de servicios, el operador o el paciente sufran lesiones provocadas por causas eléctricas, mecánicas o de otra naturaleza.
VARNING (SV)	<p>Den här servicehandboken finns bara tillgänglig på engelska.</p> <ul style="list-style-type: none"> • Om en kunds servicetekniker har behov av ett annat språk än engelska, ansvarar kunden för att tillhandahålla översättningstjänster. • Försök inte utföra service på utrustningen om du inte har läst och förstår den här servicehandboken. • Om du inte tar hänsyn till den här varningen kan det resultera i skador på serviceteknikern, operatören eller patienten till följd av elektriska stötar, mekaniska faror eller andra faror.

OPOZORILO (SL)	<p>Ta servisni priročnik je na voljo samo v angleškem jeziku.</p> <ul style="list-style-type: none"> • Če ponudnik storitve stranke potrebuje priročnik v drugem jeziku, mora stranka zagotoviti prevod. • Ne poskušajte servisirati opreme, če tega priročnika niste v celoti prebrali in razumeli. • Če tega opozorila ne upoštevate, se lahko zaradi električnega udara, mehanskih ali drugih nevarnosti poškoduje ponudnik storitev, operater ali bolnik.
DİKKAT (TR)	<p>Bu servis kılavuzunun sadece İngilizcesi mevcuttur.</p> <ul style="list-style-type: none"> • Eğer müşteri teknisyeni bu kılavuza İngilizce dışında bir başka lisandan talep ederse, bunu tercüme ettirmek müşteriye düşer. • Servis kılavuzunu okuyup anlamadan ekipmanlara müdahale etmeyiniz. • Bu uyarıya uyulmaması, elektrik, mekanik veya diğer tehlikelerden dolayı teknisyen, operatör veya hastanın yaralanmasına yol açabilir.
ЗАСТЕРЕЖЕННЯ (UK)	<p>Даний посібник з експлуатації доступний тільки англійською мовою.</p> <ul style="list-style-type: none"> • Якщо постачальник послуг клієнта спілкується іноземною мовою, тоді клієнт зобов'язаний забезпечити переклад. • Заборонено проводити огляд обладнання без попереднього звертання до даного посібника з експлуатації і розуміння інформації, поданої у ньому. • Недотримання цього застереження може завдати шкоди здоров'ю постачальника послуг, оператора або пацієнта через ураження електричним струмом, механічну травму або інше ушкодження.

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Chapter 1 Introduction

1.1 Scope

This service manual describes how to maintain, repair, and service the Panda and Giraffe Warmers that are used in hospital delivery rooms, hospital newborn nurseries, and neonatal intensive care units (NICU).

1.2 Intended users

The intended users for this manual are biomedical engineering service providers of the hospital and GE service personnel.

1.3 User responsibility

The device operates as this manual and related labels or inserts describe, when the supplied instructions to assemble, operate, do the maintenance, and repair the device are obeyed. You must periodically check the device. Do not use a defective device. Immediately replace all parts that are broken, missing, worn, damaged, or have contamination. If such repair or replacement becomes necessary, call or write to the nearest GE Healthcare Regional Service Center for service recommendations. Only GE Healthcare qualified personnel must repair the device and its parts according to the written instructions supplied by GE Healthcare. The user of the device is responsible for all malfunctions that occur because of incorrect use, incorrect maintenance, incorrect repair, damage, or change by a person other than GE Healthcare.

1.4 Introduction

The GE Healthcare Panda and Giraffe Warmers are devices with a radiant heating source intended to maintain the thermal balance of an infant patient by direct radiation of energy in the infrared region of the electromagnetic spectrum.

Radiant heat from an infrared heat source is focused onto the bed to warm the patient. The operator may select either the heater power (Manual Mode) or skin temperature (Baby Mode) control method. Depending on the control method selected, the heater is either regulated at the operator selected power level or the heater output is modulated to maintain the patient's temperature at the value selected by the operator.

The Panda and Giraffe Warmers are each offered in a bedded model: the Panda iRes Warmer and the Giraffe Warmer. The Panda Warmer also offers 2 non-bedded models: Freestanding and Wall Mount. The model type is indicated on the label and on the device's splash screen.

Table 1-1 Warmer models

Panda iRes Warmer (bedded)	Panda Freestanding Warmer (non-bedded)	Panda Wall Mount Warmer (non-bedded)	Giraffe Warmer
			

Table 1-2 Warmer splash screen images

Panda iRes Warmer splash screen	Panda Freestanding and Panda Wall Mount Warmer non-bedded splash screen	Giraffe Warmer splash screen
		

The information in this manual refers to all models, unless otherwise specified. The term “bedded” refers to both the Giraffe Warmer and the Panda iRes Warmer.

1.4.1 Freestanding and wall-mount warmer



WARNING

PATIENT INJURY HAZARD - HYPOTHERMIA OR HYPERTHERMIA

Make sure that the bassinet is in the correct position when used with a freestanding or wall-mount warmer. A bassinet that is not in the correct position can make the patient too cold or too warm.

- You must do the pre-use checkout procedure before you put the patient in the bassinet. Make sure the casters on the freestanding warmer operate correctly and are locked when used with the bassinet.
- Use the instructions on the warmer to make sure the bassinet is at the correct height. A bassinet that is not at the correct position can make the patient too cold or too warm.
- Mattress tilt can cause hot or cold areas in the bassinet.
- Put the patient in the center of the mattress.

Figure 1-1 Freestanding model

The freestanding warmer is a movable device with which you can use a bed or bassinet.



WARNING



PERSONNEL INJURY HAZARD

Do not put more than 3 kg on each Freestanding warmer accessory rail.

Figure 1-2 Wall-mount model

The wall-mount warmer is a stationary device that you can move a bed or bassinet below.



WARNING



PERSONNEL INJURY HAZARD

Do not put more than 1.5 kg on each wall-mount warmer accessory rail.

1.4.2 Resuscitation system

There are 2 different types of resuscitation systems that can be integrated into the device: T-piece and Bag and Mask.

The integrated resuscitation system supplies the basic equipment that is required for pulmonary resuscitation of infants.

Pulmonary resuscitation includes the necessary procedures to clear the airway and supply oxygen, air/oxygen mixtures, or manual ventilation to the infant. These are clinical procedures that represent the established standard of care.*¹

Resuscitation may be necessary if an infant cannot breathe sufficiently to supply oxygen to tissue or to remove carbon dioxide from the body.

Alternative tools for ventilation must be available. Do not use the integrated resuscitation system on unattended infants.

The integrated resuscitation system includes:

- Venturi suction device
- 2 medical gas flowmeters
- Airway pressure manometer
- Peak Inspiratory Pressure (PIP) control knob (T-piece resuscitation system only)

If your device has an air/oxygen blender with high-pressure yokes, at 1.5 times the rated supply pressure, the device will internally vent the source gas to maintain blender performance.

NOTE

Some older model devices can possibly not have an air/oxygen blender.

There are no inlet pressure hoses directly connected to the inlets of the device. GE does not supply the inlet pressure hoses.

*¹ Wyllie J, Perlman JM, Kattwinkel J et al. on behalf of the Neonatal Resuscitation Chapter Collaborators. Part 7: Neonatal resuscitation: 2015 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations. Resuscitation 2015; 95: e171-e203.

1.5 Features

For information about the scale, refer to *Giraffe™ and Panda™ Scale (Shekel*) Service Manual*.

1.5.1 Heater head and radiant heater

All Giraffe and Panda devices have the same heater head to contain the radiant heater. Because of the small size of the heater reflector and its compound elliptical shape, specially made for this device, the heater head is very compact compared with other warmers currently on the market. This compact size keeps the area that the heater head fills above the bed surface to a minimum. With the area above the bed clear, the caregiver can monitor and treat the patient unobstructed. This open area also lets the head of an X-ray machine be put above the patient without moving the heater head or patient.

1.5.2 Optional integrated SpO2 and resuscitation modules

All Giraffe and Panda devices can have the optional integrated SpO2 module. The Giraffe Warmer, Panda iRes Warmer, and Panda Freestanding Warmer can also have the optional integrated resuscitation module. The SpO2 option lets the caregiver monitor the blood oxygen level of the patient. The optional resuscitation module lets the caregiver administer forced breathing if it is required. The resuscitation module can have the traditional Bag and Mask technology or T-piece technology.

1.5.3 Hands Free Alarm Silence

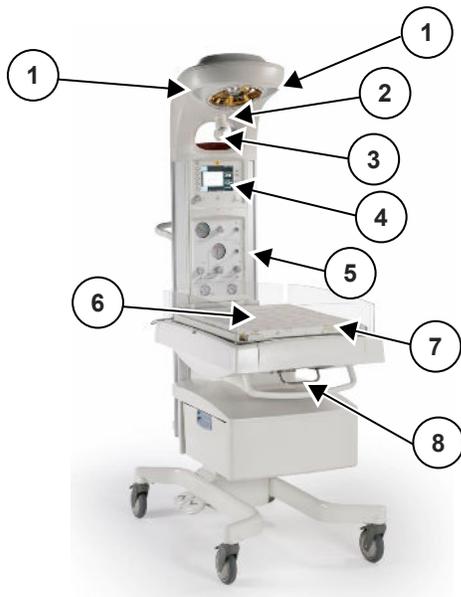
A different feature, unique in warmers, is the Hands Free Alarm Silence. This is a standard feature on all Giraffe and Panda Warmers. The Hands Free Alarm Silence operates the same as the **Alarm Silence** key for all alarms. With the Hands Free Alarm Silence, it is not necessary to touch a panel surface to silence alarms. The proximity sensor for the Hands Free Alarm Silence is found in the alarm light panel (non-IEC compliant devices) or the indicator light panel (IEC compliant devices). You can silence the alarm with a movement of the hand approximately 2 to 6 inches in front of the sensor. The Giraffe and Panda devices also have a standard **Alarm Silence** key as an alternative method to silence alarms.

1.5.4 ResusView™ Heart Rate (HR) option

The ResusView™ Heart Rate (HR) option, available only on Panda iRes Warmers (bedded), measures the heart rate of the patient. When the HR option is enabled, a heart symbol flashes on the screen, the ECG waveform shows on the screen, and an audio tone operates at a speed that is consistent with the heart rate measurement.

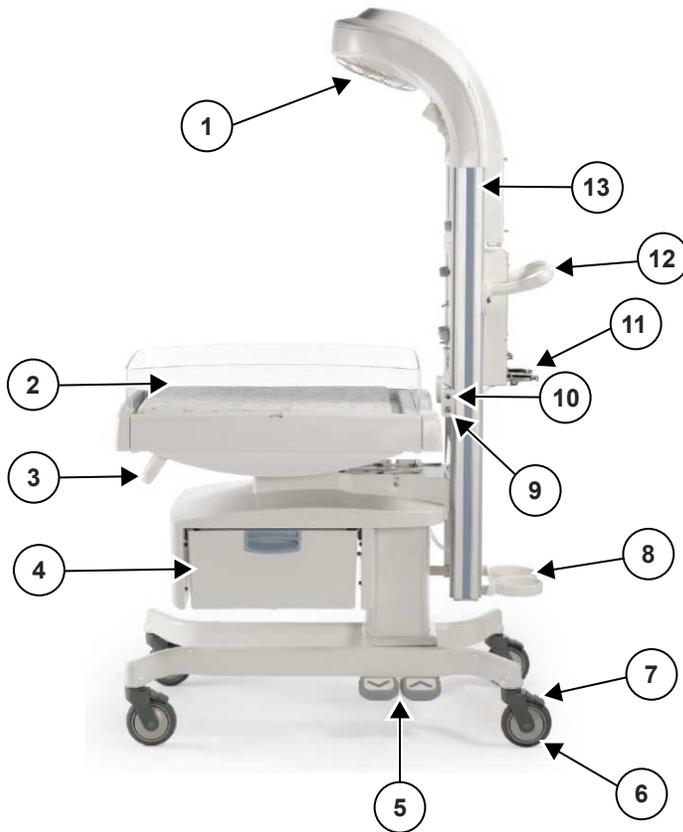
1.6 Mechanical controls, cable connections, and features

Figure 1-3 Warmer, front oblique view



Item	Description	Models
1	2 dimmable observation lights	All
2	Adjustable procedure light (optional for Panda)	All
3	Procedure light switch	All
4	Display screen	All
5	Integrated resuscitation system (optional)	Bedded Freestanding
6	Bed, with integrated scale (optional)	Bedded
7	Front bedside panel	Bedded
8	Tilt lever	Bedded

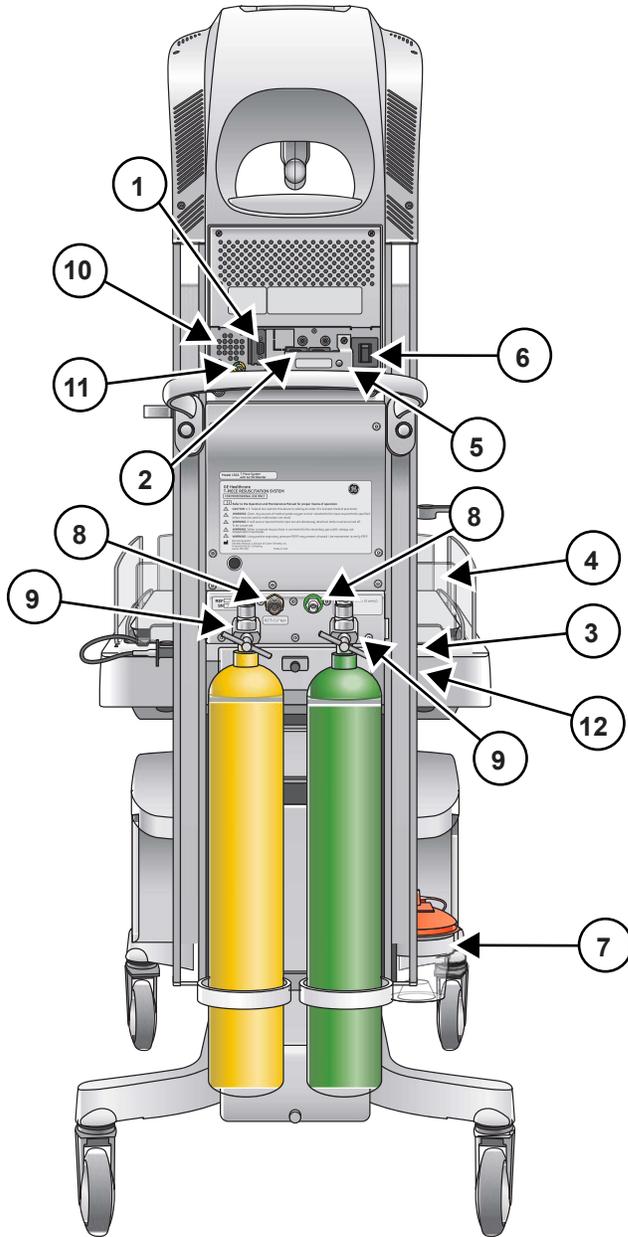
Figure 1-4 Warmer, side view



Item	Description	Models
1	Recessed radiant heater	All
2	Side bedside panel	All
3	Front handle	Bedded
4	Pass-through drawer (single-drawer or double-drawer) (optional)	Bedded
5	2 height adjustment pedals and elevating base (optional)	Bedded
6	Casters <ul style="list-style-type: none"> • 3 casters for freestanding models • 4 casters for bedded models 	Bedded Freestanding
7	Brakes <ul style="list-style-type: none"> • 2 brakes for freestanding models • 4 brakes for bedded models 	Bedded Freestanding
8	Tank guard (on models with yoke-equipped resuscitation systems)	Bedded Freestanding
9	Scale cable jack	Bedded
10	Skin temperature probe jack	All
11	High-pressure air/oxygen yoke (on models with yoke-equipped resuscitation systems)	Bedded Freestanding
12	Maneuvering handle and power cord wrap	Bedded Freestanding

Item	Description	Models
13	Dovetail rail (shortened on wall-mount model, only inside on freestanding models)	Bedded Freestanding

Figure 1-5 Warmer, rear view



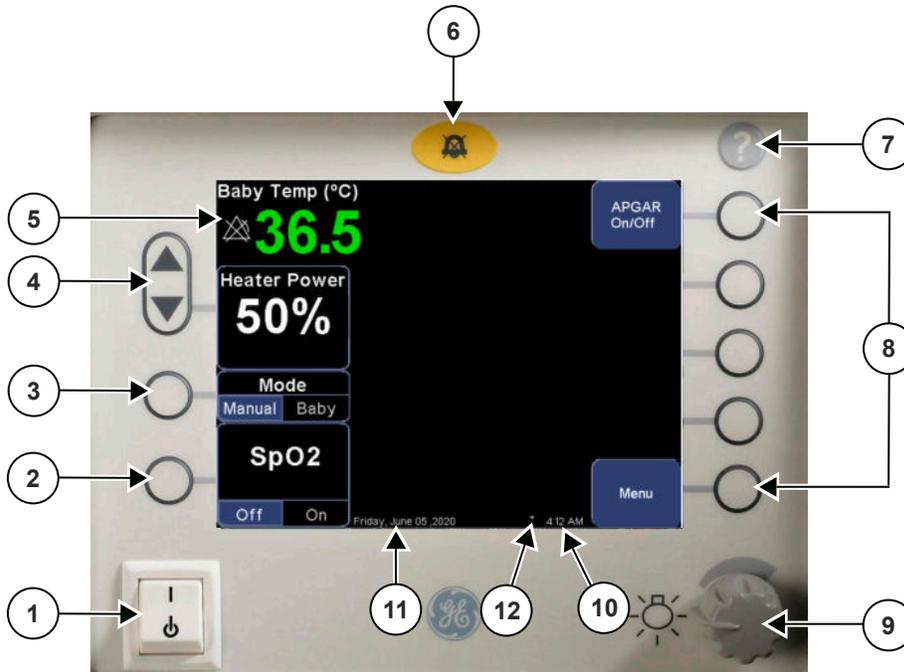
Item	Description	Models
1	RS-232 connector	All
2	2 accessory power outlets	All
3	SpO2 probe jack (optional)	All
4	Rear bedside panel	Bedded
5	Power cord inlet	All
6	Mains power switch	All
7	Suction canister holder (only on devices with resuscitation system)	Bedded Freestanding

Item	Description	Models
8	Gas connection inlets (only on devices with resuscitation system)	Bedded Freestanding
9	Tank yokes (only on devices with resuscitation system)	Bedded Freestanding
10	Speaker	All
11	Grounding equalization post	All
12	ECG Care Cable jack (optional)	Bedded

1.7 Display and display controls

You can get access to the control panel from the left or right side of the device.

Figure 1-6 Control panel and control panel screen



Item	Feature	Description
1	Power standby switch	Use the power standby switch to power on and power off the warmer.
2	Oximetry key (optional)	Use the oximetry key to set the pulse oximetry feature on or off. The oximetry key has the same function at all times. For information about the SpO2 display, see 1.7.1 Identifying the SpO2 system on page 28 .
3	Mode key	The mode key selects the Manual Mode or Baby Mode. The mode key has the same function at all times.
4	Up and down keys	The up and down keys let you navigate through the interface and select values.
5	Baby temperature	The Baby Temp shows the temperature measured by the skin temperature probe in °C or °F. The default setting is °C.
6	Alarm silence key	The alarm silence key silences alarms. You can also silence alarms with a movement of your hand directly in front of the alarm light.
7	Help key	The help key shows the help screen that supplies information about the device, alarms, and functions.
8	Task keys	The 5 task keys change their function depending on the task you will do. They control equipment settings and options.
9	Observation light switch and dimmer control	Use the dimmer control to set the observation lights on or off and set the intensity of the observation lights.
10	Time	The time shows at the bottom of the screen.
11	Date	The date shows at the bottom of the screen.
12	Moving arrow	Indicates that the processor is active.

1.7.1 Identifying the SpO2 system

There are 3 different types of SpO2 systems that can be integrated into the device: Masimo SET® 1, Masimo SET® 2, and Nellcor. To identify which SpO2 system is integrated into your device, refer to the images of the SpO2 probe jacks. A label on top of the SpO2 probe jack also identifies the SpO2 system.

Table 1-3 SpO2 probe jacks

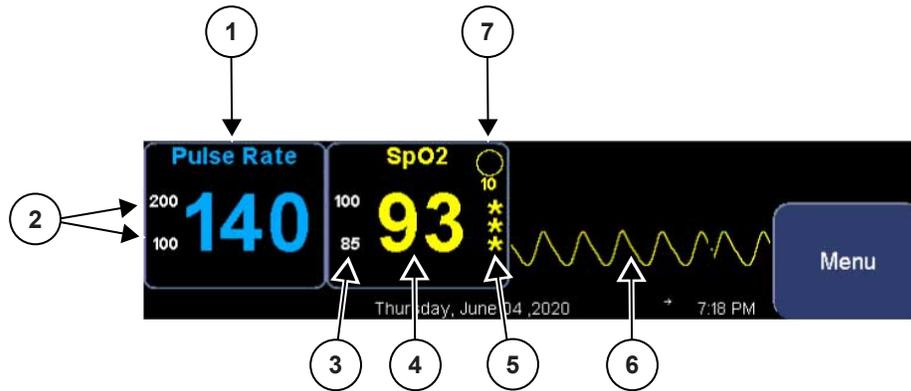
Masimo SET® 1	Masimo SET® 2	Nellcor
		

Table 1-4 Probe panel labels

Masimo SET (1 or 2)	Nellcor
	

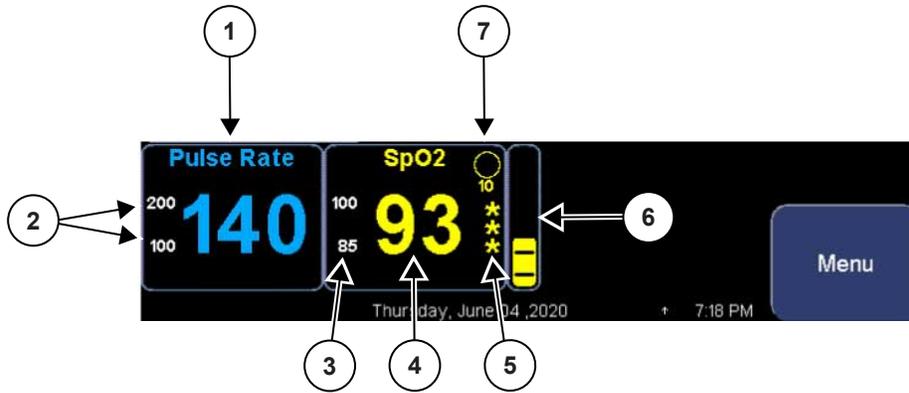
1.7.1.1 Nellcor SpO2 display

Figure 1-7 SpO2 display with plethysmograph waveform (display set to Pleth) - large view



1	Pulse rate display
2	Pulse rate upper and lower alarm limits
3	SpO2 upper and lower alarm limits
4	SpO2 display
5	Signal strength indicator The signal strength indicator consists of 0, 1, 2, or 3 asterisks, depending on the strength of the signal. 3 asterisks indicates the strongest signal.
6	Plethysmograph waveform
7	SatSeconds. SatSeconds only shows if it is enabled in the SpO2 Settings menu.

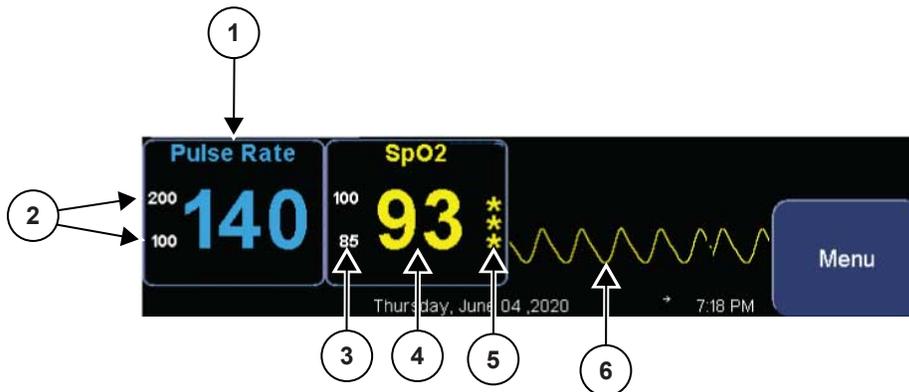
Figure 1-8 SpO2 display with blip bar (display set to Blip) - large view



1	Pulse rate display
2	Pulse rate upper and lower alarm limits
3	SpO2 upper and lower alarm limits
4	SpO2 display
5	Signal strength indicator The signal strength indicator consists of 0, 1, 2, or 3 asterisks, depending on the strength of the signal. 3 asterisks indicates the strongest signal.
6	Blip bar
7	SatSeconds. SatSeconds only shows if it is enabled in the SpO2 Settings menu.

1.7.1.2 Masimo SpO2 display

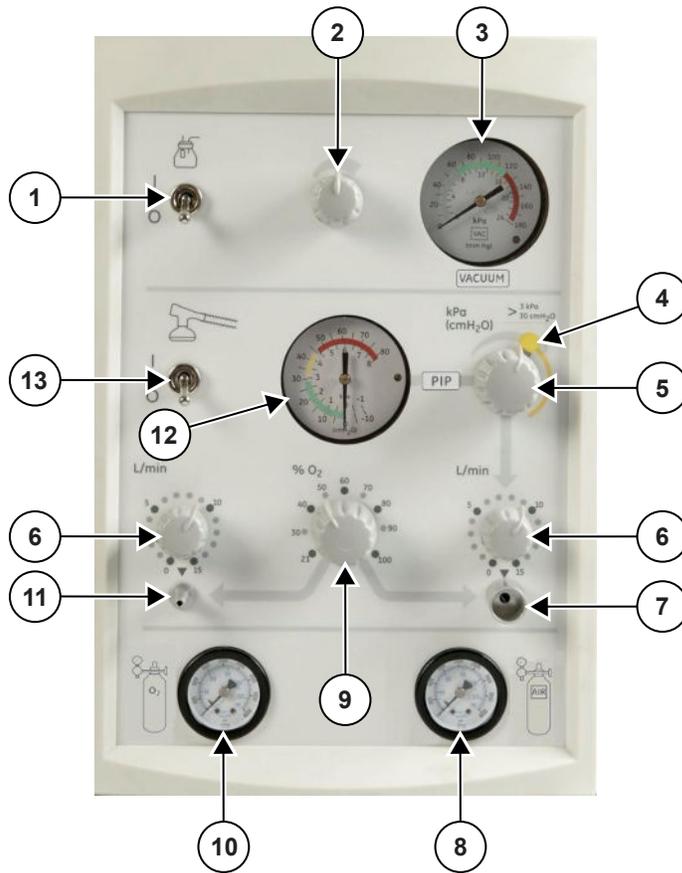
Figure 1-9 Masimo SpO2 display - large view



1	Pulse rate display
2	Pulse rate upper and lower alarm limits
3	SpO2 upper and lower alarm limits
4	SpO2 display
5	Signal strength indicator The signal strength indicator consists of 0, 1, 2, or 3 asterisks, depending on the strength of the signal. 3 asterisks indicates the strongest signal.
6	Plethysmograph waveform

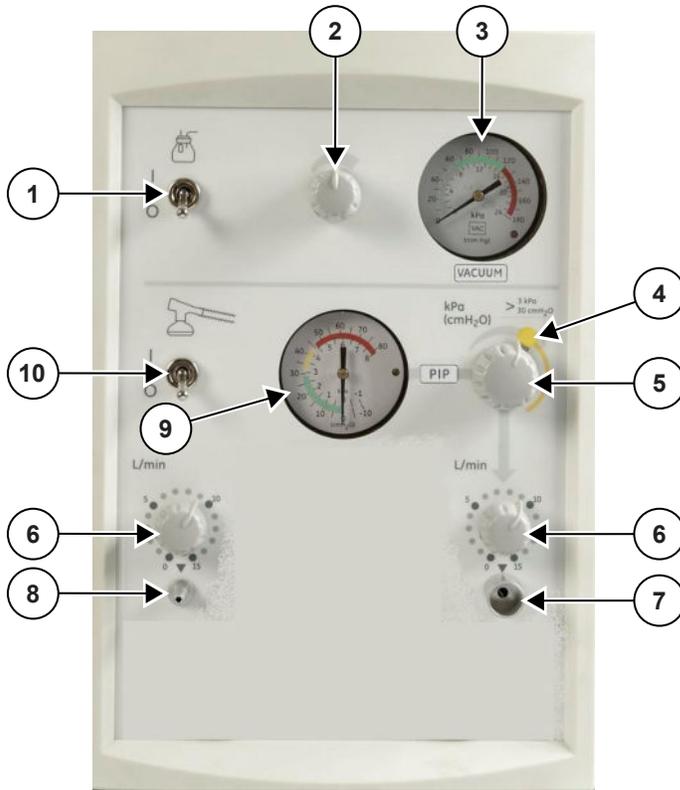
1.7.2 T-piece resuscitation system controls and connections

Figure 1-10 T-piece resuscitation system with blender and high-pressure yokes



Item	Description
1	Suction switch
2	Suction control knob
3	Vacuum regulator gauge
4	PIP override release
5	PIP control knob
6	Flowmeter control knobs
7	T-piece gas outlet
8	Air tank pressure gauge
9	Blender control knob
10	Oxygen tank pressure gauge
11	Secondary gas outlet
12	Airway pressure manometer
13	Medical gas switch

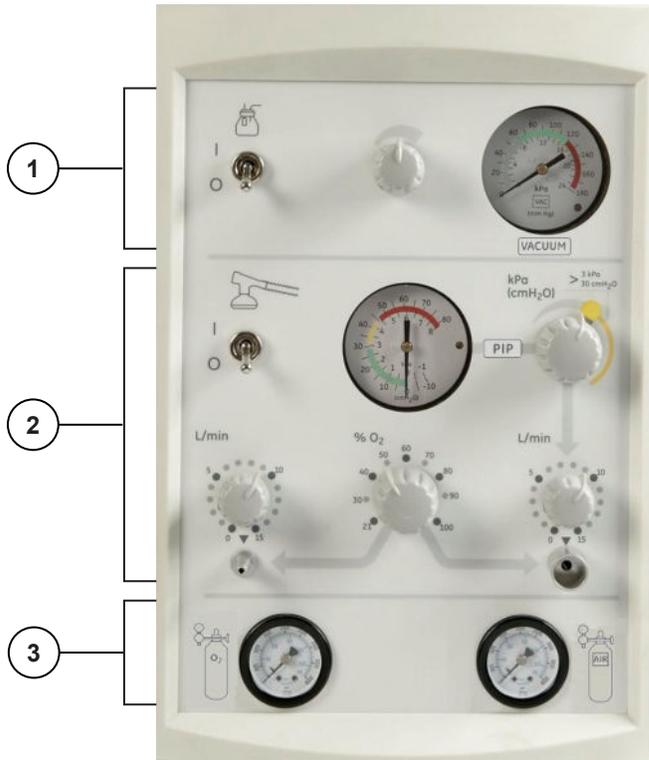
Figure 1-11 T-piece resuscitation system without blender and without high-pressure yokes



Item	Description
1	Suction switch
2	Suction control knob
3	Vacuum regulator gauge
4	PIP override release
5	PIP control knob
6	Flowmeter control knobs
7	T-piece gas outlet
8	Secondary gas outlet
9	Airway pressure manometer
10	Medical gas switch

1.7.3 T-piece resuscitation system components

Figure 1-12 T-piece resuscitation system components



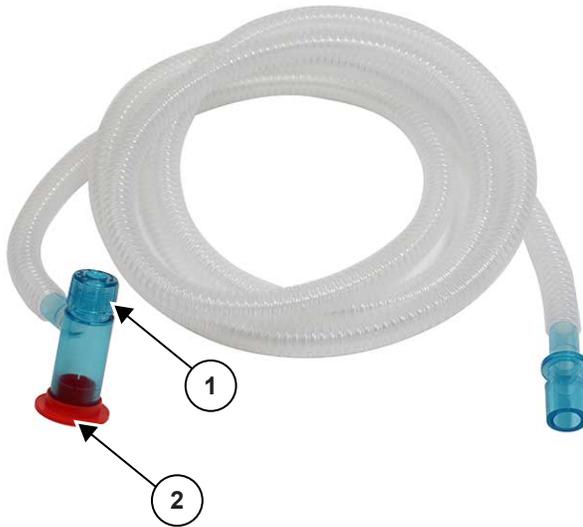
Component number	System component	Description
1	Suction	A Venturi vacuum supplies continuous suction between 0 and 150 mm Hg (0 and 20 kPa) to make the oral, tracheal, and nasal passages clear. A switch sets the power to the suction component on and off, and a knob controls the suction. A vacuum gauge identifies the suction. Tubing attached to the suction outlet connects to a collection canister below the bed level.

Component number	System component	Description
2	Oxygen delivery	<p>The T-piece system does not supply a specified gas volume to the patient.</p> <p>PIP control: The Peak Inspiratory Pressure (PIP) control knob and a flowmeter adjust the medical gas supplied to a dedicated T-piece outlet. You can set the pressure between 0 and 30 cm H₂O. You can push the PIP override release to set the pressure between 30 cm H₂O and 45 cm H₂O.</p> <p>The system does not operate with 0 input pressure.</p> <p>Secondary flowmeter: A second flowmeter control knob and outlet is available for free-flowing oxygen. The secondary flowmeter is made for resuscitation only.</p> <p>You can attach a manual resuscitator to the secondary flowmeter. The manual resuscitator must use an independently operated airway pressure manometer.</p> <p>Blender (on models equipped with a blender): The optional blender adjusts FiO₂ between 21 and 100% from the 2 medical gas outlets. You can attach gas supplies to the inlets behind the resuscitation system.</p> <p>Airway pressure manometer: The airway pressure manometer shows the PIP (Peak Inspiratory Pressure) and PEEP (Positive End Expiratory Pressure).</p>
3	Tank pressure gauges	<p>2 gauges show the pressure in the air and oxygen tanks that are mounted behind the resuscitation system. The gauges do not show the pressure of low pressure gas sources that are not mounted on the device.</p>

WARNING**PATIENT INJURY HAZARD**

Use the T-Piece system to supply oxygen only for resuscitation. Do not use it for any other purpose.

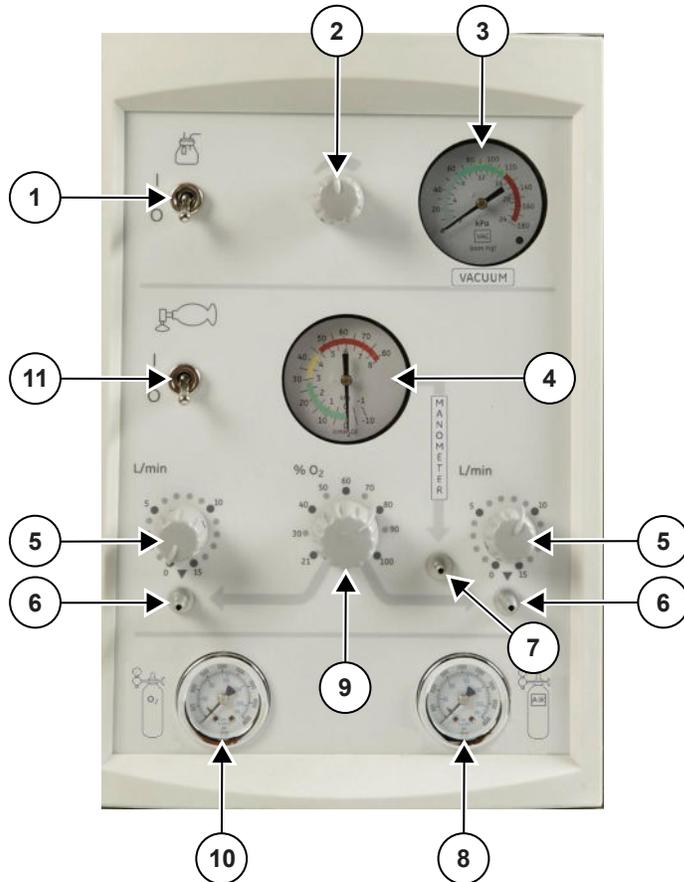
The T-piece patient circuit can have tubing, a 15 mm male connector, a T-piece fitting with a PEEP control knob, and an end cap. A face mask or a tracheal tube is also necessary to use the system. The T-piece circuits are available with or without a face mask.

Figure 1-13 T-piece circuit without face mask

1	PEEP control knob
2	End cap

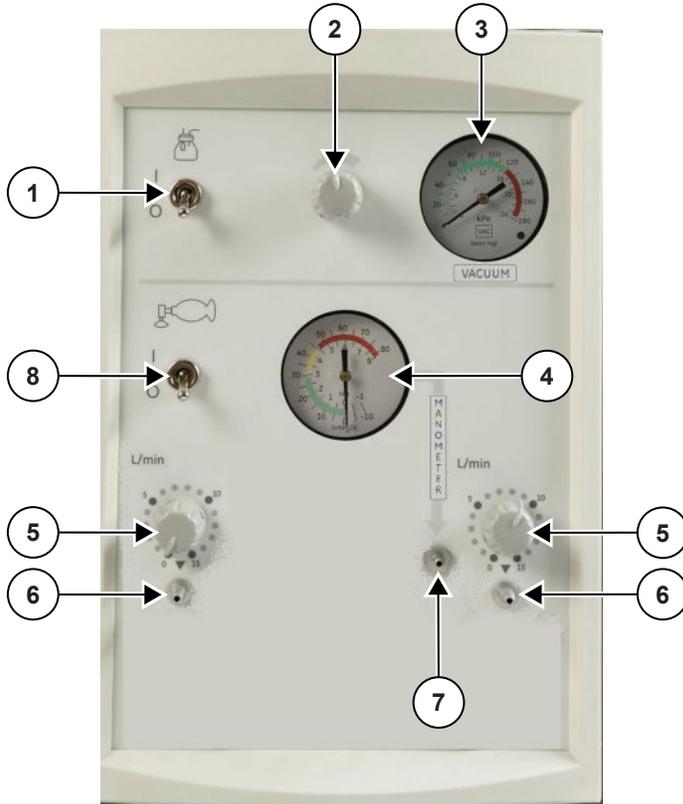
1.7.4 Bag and Mask resuscitation system controls and connections

Figure 1-14 Bag and Mask resuscitation system with blender and high-pressure yokes



Item	Description
1	Suction switch
2	Suction control knob
3	Vacuum regulator gauge
4	Airway pressure manometer
5	Flowmeter control knobs
6	Medical gas outlets
7	Manometer connector
8	Air tank pressure gauge
9	Blender control knob
10	Oxygen tank pressure gauge
11	Medical gas switch

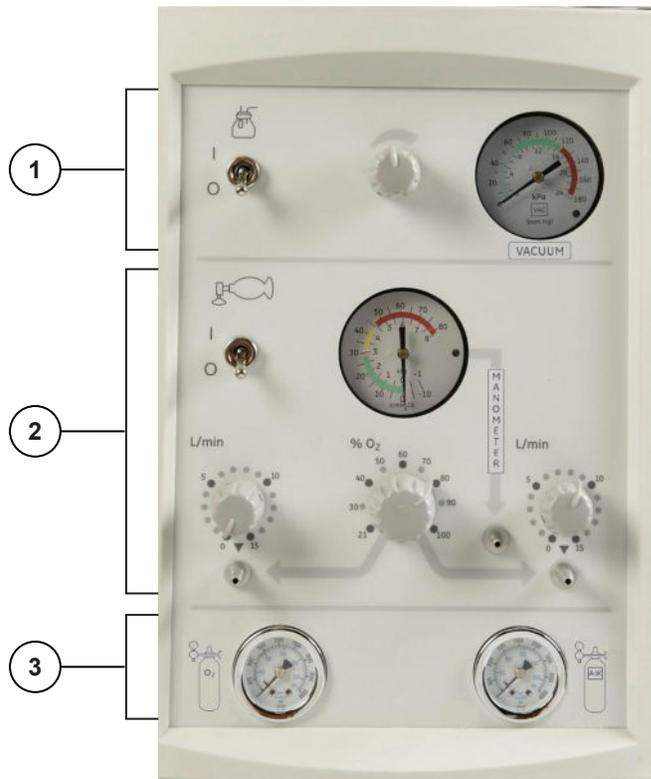
Figure 1-15 Bag and Mask resuscitation system without blender and without high-pressure yokes



Item	Description
1	Suction switch
2	Suction control knob
3	Vacuum regulator gauge
4	Airway pressure manometer
5	Flowmeter control knobs
6	Medical gas outlets
7	Manometer connector
8	Medical gas switch

1.7.5 Bag and Mask resuscitation system components

Figure 1-16 Bag and Mask resuscitation system components



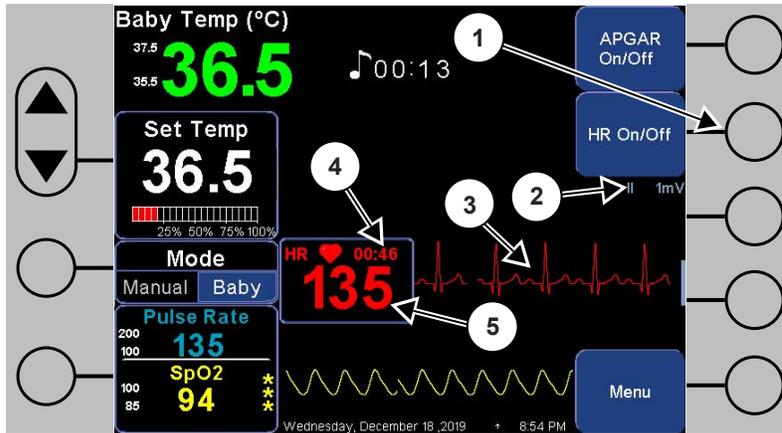
Component number	System component	Description
1	Suction	A Venturi vacuum supplies continuous suction between 0 and 150 mm Hg (0 and 20 kPa) to make the oral, tracheal, and nasal passages clear. A switch sets the power to the suction component on and off, and a knob controls the suction. A vacuum gauge identifies the suction. Tubing attached to the suction outlet connects to a collection canister below the bed level.
2	Oxygen delivery	The system does not operate with 0 input pressure. Flowmeters: 2 flowmeters control the flow of medical gases from the outlets below the control knobs. You can attach a manual resuscitator to 1 of the 2 outlets. The manual resuscitator must use an airway pressure manometer. Blender (on models equipped with a blender): The optional blender adjusts FiO ₂ between 21 and 100% from the 2 medical gas outlets. You can attach gas supplies to the inlets behind the resuscitation system. Airway pressure manometer: The airway pressure manometer shows the PIP (Peak Inspiratory Pressure) and PEEP (Positive End Expiratory Pressure). You can attach a manual resuscitator (not included) to the airway pressure manometer. The airway pressure manometer does not show the delivery pressures that are more than 80 cm H ₂ O. But, the delivery pressure of some manual resuscitators can be more than 80 cm H ₂ O.

Component number	System component	Description
3	Tank pressure gauges	2 gauges show the pressure in the air and oxygen tanks that are mounted behind the resuscitation system. The gauges do not show the pressure of low pressure gas sources that are not mounted on the device.

1.7.6 Heart Rate display and controls

The ResusView Heart Rate Option is only available on Panda iRes Warmers (bedded).

Figure 1-17 Heart Rate display



Item	Feature	Description
1	HR On/Off	Use the HR On/Off key to set the ResusView Heart Rate Option on and off.
2	Lead II mV symbol	The lead II symbol is the ECG waveform between lead RA and LL. The "mV" means ECG waveform gain in mV/mm.
3	ECG Waveform	Shows the electrical activity of the heart.
4	Countdown timer	Shows the remaining minutes and seconds of time until the shutdown of the ResusView Heart Rate Option. The ResusView Heart Rate Option automatically powers off after 30 minutes of operation.
5	Heart Rate value with flashing heart rate icon	The heart rate icon flashes with each beat detection and the heart rate is shown as a numeric value.

NOTE

The pulse rate is from the SpO2 module and the heart rate is from the ResusView Heart Rate Option.

1.8 Abbreviations and acronyms

Table 1-5

Abbreviation or acronym	Meaning
bpm	beats per minute
CF	cardiac floating
cm-H ₂ O	a unit of pressure measured in centimeters of water

Table 1-5 (Table continued)

Abbreviation or acronym	Meaning
ECG	electrocardiogram
ESD	electrostatic discharge electrostatic sensitive device
FiO ₂	fraction of inspired oxygen
g	grams
GUI	graphical user interface
HFOV	high frequency oscillating ventilation
HR	heart rate
IFU	instructions for use
L/min	liters per minute
LED	light-emitting diode
mmHg	a unit of pressure measured in millimeters of mercury
NICU	neonatal intensive care unit
PEEP	positive end expiratory pressure
pH	power of hydrogen
PIP	peak inspiratory pressure
PPE	personal protection equipment
RAM	random access memory
RoHS	Restriction of Hazardous Substances
UPS	uninterruptible power supply

1.9 Illustrations

All illustrations are provided as examples only. Your device may not be equipped with the specific feature shown. In addition, unless explicitly stated, the display examples may not represent your equipment setup or displayed data.

1.10 References

- *Panda™ Warmer Family User Manual, M1110737*
- *Giraffe™ Warmer User Manual, M1110734*
- *Resuscitation Systems Service Manual, M1128929*
- *Addendum, UPS for Giraffe™ and Panda™ Products, M1121136*

Chapter 2 Safety

2.1 Safety definitions

The following definitions are used to classify precautions on product safety in this manual. Failure to observe precautions could result in injury to people or damage to property.

DANGER



Indicates a hazardous situation that, if not avoided, will result in death

WARNING



Indicates a hazardous situation that, if not avoided, could result in death or serious injury

CAUTION



Indicates a potential hazard that, if not avoided, could result in minor injury

NOTICE

Indicates a potential situation that, if not avoided, could result in equipment damage

NOTE

Notes are used to draw attention to important information.

2.2 Important safety information

WARNING



PERSONNEL OR PATIENT INJURY HAZARD

This service manual is only available in English. If a customer's service provider requires a language other than English, it is the customer's responsibility to supply the translation services.

The service procedures in this manual must only be done by approved service personnel. Before you do a Service procedure you must read the procedure and all safety instructions in the User and Service manuals. If you do not understand the procedure or safety instructions, do not do the procedure.

The service information is important for the safety of both the patient and operator and also serves to enhance equipment reliability.

The information contained in this service manual pertains only to those models of products which are marketed by GE Healthcare as of the effective date of this manual or the latest revision thereof.

This service manual was prepared for exclusive use by GE Healthcare service personnel in light of their training and experience as well as the availability to them of parts, proper tools, and test equipment. Consequently, GE Healthcare provides this service manual to its customers purely as a business convenience and for the customer's general information only without warranty of the results with respect to any application of such information.

Furthermore, because of the wide variety of circumstances under which maintenance and repair activities may be performed and the unique nature of each individual's own experience, capacity, and qualifications, the fact that a customer has received such information from GE Healthcare does not imply in any way that GE Healthcare deems said individual to be qualified to perform any such maintenance or repair service. Moreover, it should not be assumed that every acceptable test and safety procedure or method, precaution, tool, equipment, or device is referred to within, or that abnormal or unusual circumstances may not warrant or suggest different or additional procedures or requirements. This manual is subject to periodic review, update, and revision. Customers are cautioned to obtain and consult the latest revision before undertaking any service of the equipment.

Do not use malfunctioning equipment. If the device is under warranty, contact GE technical support at the number on the back of the manual before performing any repairs on the device.

2.3 Safety hazards

2.3.1 Protection against electrical hazards

WARNING



ELECTRICAL SHOCK HAZARD

To avoid risk of electric shock, this equipment must only be connected to a supply mains with protective earth.

WARNING



ELECTRICAL SHOCK HAZARD

Do not clean or service the device while the power cord is connected to an electrical outlet. This can cause an electrical shock.

Disconnect the power cord from the electrical outlet before cleaning or service. Connect the device to an electrical outlet only when told to in the cleaning or service procedure.

WARNING



PATIENT INJURY HAZARD

Do not touch a plug marked with an ESD symbol. Before you connect a cable to an ESD marked plug, you must touch a device rail to discharge any static charge.

WARNING



PERSONNEL INJURY HAZARD - SHOCK

Do not connect a device that has not been specified as compatible with the warmer to the warmer auxiliary power outlets.

NOTICE**SENSITIVE TO ELECTROSTATIC DISCHARGE**

A part on the device marked with an electrostatic sensitive device (ESD) symbol is sensitive to electrostatic discharge and you must use ESD control procedures. A manual procedure marked with an ESD symbol tells you to use ESD control procedures.

2.3.2 Protection against mechanical hazards

WARNING**PATIENT FALL HAZARD**

You must do the pre-use checkout procedure before you put the patient in the device.

Make sure that the 4 bedside panels operate correctly. If a bedside panel does not operate correctly or is damaged, replace the bedside panel before you put the patient in the device.

WARNING**PATIENT FALL HAZARD**

You must do the pre-use checkout procedure before you put the patient in the device. Do not use Panda iRes Warmer bedside panels with a Giraffe Warmer. The Panda iRes Warmer and Giraffe Warmer bedside panels are different heights.

WARNING**PATIENT INJURY HAZARD**

Inspect the device carefully and do not use it if it is dirty or has visible debris, is damaged, or has missing parts.

Before each use, carefully inspect the following accessories to make sure they are clean and not damaged:

- Temperature probe and cables
- Resuscitation accessories
- SpO2 sensors and cables (do not use the sensor if you can see the optical components)
- Mattress (check the entire mattress for rips)

WARNING**PATIENT INJURY HAZARD**

Do not use the bedside panels to move the warmer. Only use the front handle or maneuvering handle to move the warmer. If warmer bedside panels are used to move a warmer, the panels can crack or the panel latches can break. If an infant makes contact with a bedside panel that has a crack or a broken latch, the panel can disengage and the infant can fall from the warmer bed.

**WARNING**

PERSONNEL OR PATIENT INJURY HAZARD

Do not lean against the side of the warmer. This can cause it to tip over.

**WARNING**

PERSONNEL OR PATIENT INJURY HAZARD

Do not overload the accessories:

- Do not put more than 19 kg on 1 accessory rail.
- Do not put more than 22 kg total on the 2 accessory rails.
- Try to equally balance the weight between the 2 accessory rails.
- Even if an accessory can accommodate more weight, do not exceed the rail load limits.
- Do not use more than 1 GCX mount on the accessory rails.
- Do not put more than 6.8 kg on the storage drawer.
- Do not put more than 3.6 kg on the drawer instrument shelf.
- Do not put more than 9 kg on the instrument shelf.
- Do not put more than 3 kg on the DIN rail.

**CAUTION**

PATIENT INJURY HAZARD

Make sure users have unobstructed access to the device.

2.3.3 Protection against contamination hazards

**WARNING**

ALLERGY HAZARD

Do not use latex for device maintenance or repair. The device is latex-free.

2.3.4 Protection regarding functional hazards

**WARNING**

PERSONNEL OR PATIENT INJURY HAZARD

The service procedures in this manual must only be done by approved service personnel. When you do a Service procedure you must:

- Verify you have the latest version of the Service manual
- Read the procedure and all safety instructions in the User and Service manuals. If you do not understand the procedure or safety instructions, do not do the procedure
- Use the correct tools and test equipment.

**WARNING****PERSONNEL OR PATIENT INJURY HAZARD**

Before you use or service this device, you must read the User manual and all safety instructions for the device. If you do not understand the User manual or safety instructions, do not use the device.

**WARNING****PATIENT INJURY HAZARD**

Make sure the distance from the heater to the surface of the mattress is more than 85 cm. If the distance is less than 85 cm, the warmer can operate incorrectly.

**WARNING****PERSONNEL INJURY HAZARD - ENVIRONMENTAL IMPACT**

Obey local waste disposal regulations when you replace batteries, electronics, or other parts.

**WARNING****PATIENT INJURY HAZARD**

Fixed-base beds only: Do not adjust the height of the fixed-base bed with the patient in the bed. Before you put the patient in the bed, make sure the fixed base is locked in position.

**WARNING****PATIENT INJURY HAZARD - HYPOTHERMIA**

Do not put the patient in the bed in Warmup Mode. Warmup Mode quickly makes the bed warm and keeps the bed warm before you put the patient in the bed. Warmup Mode must not be used with a patient because the Check Baby Alarm is disabled. You must use Manual Mode or Baby Mode with a patient.

**WARNING****PATIENT INJURY HAZARD**

When you weigh the patient, weight measurements can be incorrect if:

- The scale is not correctly calibrated
- The lock screws are not removed
- The mattress is not put on the platform correctly
- The plexiglass plate is not installed
- The mattress platform is tilted
- You lean on the bed while you weigh the patient
- There are other objects on the bed that are leaning against the walls of the bed

WARNING**FIRE OR SMOKE HAZARD**

Do not spray cleaning solution into the vents behind the heater head. The spray can cause fire or cause damage to internal electrical components.

WARNING**OXYGEN 93 HAZARD**

Do not use the blender with Oxygen 93. The blender is not suitable for use with Oxygen 93.

CAUTION**PATIENT INJURY HAZARD - DELAY IN CARE**

Do not use the bedside panels to move the warmer. Only use the front handle or maneuvering handle to move the warmer.

CAUTION**PATIENT INJURY HAZARD**

Do not pull on the patient probe wire. To remove the probe from the skin, gently lift the adhesive patch. Pull the probe at the plug to remove the probe from the jack. When you clean the probe, be careful not to pull on the probe tip or probe wire and not to bend the probe lead end.

CAUTION**PATIENT INJURY HAZARD**

Make sure the patient probe and scale connector plates or filler plate (for a device without the SpO2 option) are secure. Loose plates can cause interference or damage to the device.

2.3.5 Protection regarding equipment hazards

WARNING**PATIENT INJURY HAZARD - RADIO FREQUENCY INTERFERENCE**

This device may cause radio interference or may disrupt the operation of nearby equipment. It may be necessary to reposition or move the device to a new location, or shield the location, to prevent interference.

WARNING**PATIENT INJURY HAZARD - HYPOTHERMIA OR HYPERTHERMIA**

Do not put the warmer in a high ambient airflow environment. If there is a high airflow, the radiant heater may not properly warm the patient.

2.3.6 Protection against fire hazards



WARNING

FIRE OR PATIENT INJURY HAZARD - HYPOTHERMIA

Do not hang items from the heater head or heater grill. The item can burn when the warmer is on. An item in the heat path can also decrease heat to the patient and cause the patient to become cold.



WARNING

FIRE OR EXPLOSION HAZARD

Do not use oil, grease or other flammable material on the valve, yoke, or cylinder. Oxygen in the system can cause these materials to burn or explode. Only use approved lubricants that are not flammable.

Make sure you wear clean and dry gloves when you touch connection gaskets. If gloves are not available, make sure you carefully clean and fully dry your hands before you touch a gasket. Do not apply lotions or alcohol-based cleaners to your hands.



WARNING

FIRE OR EXPLOSION HAZARD

Do not use flammable anesthetic gas around the warmer.



WARNING

FIRE HAZARD

Make sure all parts are fully dry after cleaning and disinfection. During operation, any remaining flammable cleaner can cause a fire.

2.4 Safety signs

Mandatory action signs

These signs indicate a mandatory action and are identified by a blue background and white symbol.

Table 2-1 Mandatory action signs

	Description	Symbol standard reference
	General mandatory action sign	ISO 7010-M001

Prohibition signs

These signs indicate prohibited actions and are identified by a red cross-out circle.

Table 2-2 Prohibition signs

	Description	Symbol standard reference
	General prohibition sign	ISO 7010-P001

Warning signs

These signs are identified by a yellow background, black triangular band, and a black symbol.

Table 2-3 Warning signs

	Description	Symbol standard reference
	General warning sign	ISO 7010-W001

2.5 Symbols displayed on the device

The following symbols may be used on the device, the device labels (including documentation) or the device packaging. Not all symbols may be used with a specific device.

Table 2-4 Symbols displayed on the device

Symbol	Usage	Symbol standard reference
	Active alarm indicator (yellow or red)	-
	Air tank pressure	-
	Airway pressure manometer	-
	Alarm off	IEC 60417-5319 Definition deviated by IEC 60601-1-8

Table 2-4 Symbols displayed on the device (Table continued)

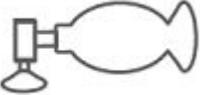
Symbol	Usage	Symbol standard reference
	Alternating current	IEC 60417-5032
	Audio alarm	IEC 60417-5013
	Audio alarm paused – temporary	IEC 60417-5576-2
	Authorized Representative in the European community	ISO 15223-1
	Baby	IEC 60417-5667
	Bag and mask	-
	Batch code	ISO 7000-2492
	Catalogue number	ISO 7000-2493
	Clockwise rotation increases magnitude	-
	Consult instructions for use	ISO 7000-1641
	Control down	-
	Control up	-
	CSA Group certification mark to US and Canadian standard	-
	Date of manufacture	ISO 7000-2497

Table 2-4 Symbols displayed on the device (Table continued)

Symbol	Usage	Symbol standard reference
	Devices with a CE symbol agree with the European Council Directive (93/42/EEC) for Medical Devices when they are operated and maintained as specified in the device User Manual. XXXX represents the Notified Body certification number.	ISO 7000-0623
	Do not lean on device	-
	Do not place devices in radiant heat path	-
	Do not step or stand on surface.	-
	Do not use the front (furthest away from the Healthcare Provider Control Panel) bedside panel as a handle for maneuvering the warmer.	-
	Do not use the side bedside panels as a handle for maneuvering the warmer.	-
	Do not use the side bedside panels as a handle for maneuvering the warmer.	-
	Earth ground	IEC 60417-5017
	Electrostatic sensitive device	IEC 60417-5134
	Equipotentiality	IEC 60417-5021
	EurAsian Conformity Mark	-
	For professional use only. Equipment shall be used only by qualified, trained medical personnel.	-

Table 2-4 Symbols displayed on the device (Table continued)

Symbol	Usage	Symbol standard reference
	For single use only. Do not reuse.	ISO 7000:1051
	Fragile, handle with care	ISO 7000-0621
	Giraffe Warmer	-
	Help menu	-
	Humidity limits	ISO 7000-2620
	Keep dry	ISO 7000-0626
	Latex free	-
	Make sure bedside panels are latched and secure.	-
	Manufacturer	IEC TR 60878-3082
	Mattress height label	-
	Maximum patient weight	-
	Medical-grade air connection	-

Table 2-4 Symbols displayed on the device (Table continued)

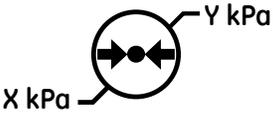
Symbol	Usage	Symbol standard reference
	Medical-grade oxygen connection	-
	Nonsterile	ISO 7000-2609
	Observation light	-
	Oxygen tank pressure	-
	Panda Warmer	-
	Patient temperature	-
	Peak inspiratory pressure	-
	Pinch hazard	-
	Positive end expiratory pressure	-
	Power off	IEC 60417-5008
	Power on	IEC 60417-5007
	Pressure limits	ISO 7000-2321
	Previous caution symbol used on some devices to usually indicate equipment damage. This symbol is identified by a white background, black triangular band, and a black symbol. See 2.1 Safety definitions on page 41 for current symbol usage.	ISO 7000-0434A
	Protective earth	IEC 60417-5019
	Refer to instruction manual/booklet Follow instructions for use	ISO 7010-M002
	Scale	-

Table 2-4 Symbols displayed on the device (Table continued)

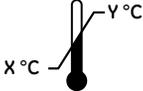
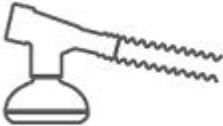
Symbol	Usage	Symbol standard reference
	Serial number	ISO 7000-2498
	Single patient multiple use	Medical Devices Regulation 2017/745/EU
	Standby	IEC 60417-5009
	Suction	-
	Temperature limits	ISO 7000-0632
	The UDI (Unique Device Identification) is a unique marking for identification of the medical device.	FDA CFR 801.20
	T-piece with mask	-
	Type BF applied part	IEC 60417-5333
	UNION MADE	-
	Use no oil	ISO 7010-P001
	Use the front handle below the bed for maneuvering the warmer.	-
	Use the handle at the back of the warmer for maneuvering the warmer.	-

Table 2-4 Symbols displayed on the device (Table continued)

Symbol	Usage	Symbol standard reference
	Vacuum	-
	Waste of Electrical and Electronic Equipment (WEEE) This symbol indicates that the waste of electrical and electronic equipment must not be disposed as unsorted municipal waste and must be collected separately. Contact an authorized representative of the manufacturer for information concerning the decommissioning of your equipment.	EN 50419
	Weight	-

2.6 Standards

The device is designed to meet the requirements of the latest recognized version of the standards that follow:

- IEC 60601-1
- ANSI/AAMI ES60601-1
- CAN/CAS-C22.2 No. 60601-1
- IEC 60601-1-2
- IEC 60601-2-21
- IEC 60601-2-49
- 21 CFR CH-1 Section 1020.30 (n)

Devices with the resuscitation option comply with the standards that follow, too:

- ISO 10651-5 – Gas-powered emergency resuscitators
- ISO 11195 – Gas mixer for medical use – standalone gas mixers

Devices with the SpO2 option comply with the standards that follow, too:

- ISO 80601-2-61 with the exclusion to clause 201.15.3.5.101.1 with regard to shock and vibration

Devices with the ResusView™ Heart Rate Option comply with the standards that follow, too:

- IEC 60601-2-27

Devices with the scale option comply with the standards that follow, too:

- BS EN 45501

After the installation of a replacement part, accessory, or option, this device must be evaluated for compliance to these standards.

2.7 Electromagnetic compatibility (EMC) guidance

WARNING



RADIO FREQUENCY INTERFERENCE HAZARD

Portable and mobile RF communication equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to any part of this equipment including cables specified by the manufacturer. Otherwise, degradation of the performance of this equipment could result.

WARNING



PATIENT INJURY HAZARD - INTERFERENCE

Use of this equipment adjacent to or stacked with other equipment should be avoided because it could result in improper operation. If such use is necessary, this equipment and the other equipment should be observed to verify that they are operating normally.

WARNING



PATIENT INJURY HAZARD

The use of accessories, transducers and cables other than those specified or provided by the manufacturer of this equipment could result in increased electromagnetic emissions or decreased electromagnetic immunity of this equipment and result in improper operation.

Accessories and components identified by GE Healthcare as compatible for use with this device have been tested to confirm normal operation.

2.7.1 Electromagnetic compatibility essential performance

The following device performance features are considered essential to performance:

- Patient skin temperature measurement accuracy
- Alarms for patient measurement parameters
- Patient SpO₂ (oxygen saturation) and pulse rate measurement accuracy
- Retention of patient data and restoration of system settings during 30 seconds or less power interruptions
- Patient heart rate measurement accuracy
- Display information for patient parameters (SpO₂ indication of greater than 30 seconds display update time and signal inadequacy and ECG- Gain, amplitude indication and Waveform sweep speed)
- Restoration of previous operating mode within 15 seconds of exposure to defibrillation energy with exception of the ResusView™ Heart Rate option
- Immunity to High Frequency surgical devices for patient skin temperature and SpO₂
- Patient weight measurement accuracy (if the scale is installed)

2.7.2 Degraded performance characteristics

High level electromagnetic disturbance can cause degraded performances including display flicker, system restart, loss of thermoregulation, erratic or errors in parametric measurement, erroneous system failures, and false alarms.

2.7.3 Guidance and manufacturer's declaration – electromagnetic emissions

The system is intended for use in the environment specified as follows.

Table 2-5 Electromagnetic emissions

Emissions test	Compliance	Electromagnetic environment guidance
RF emissions CISPR 11	Group 1	The system uses RF energy only for its internal function. Thus, its RF emissions are very low and are not likely to cause interference in nearby electronic equipment.
RF emissions CISPR 11	Class A	The system is suitable for use in all establishments, other than domestic and those directly connected to the public low voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations/flicker emissions IEC 61000-3-3	Complies	

The emissions characteristics of this equipment make it suitable for use in industrial areas and hospitals (CISPR 11 class A). If it is used in a residential environment (for which CISPR 11 class B is normally required), this equipment might not offer adequate protection to radio-frequency communication services. The user might need to take mitigation measures, such as relocating or reorienting the equipment.

2.7.4 Manufacturer's guidance and declaration regarding electromagnetic immunity

The device is intended for use in the environment specified as follows.

Table 2-6 Electromagnetic immunity

Immunity test	IEC 60601-1-2 test level	Compliance level	Electromagnetic environment guidance
Electrostatic discharge IEC 61000-4-2	±8 kV contact ±2 kV, ±4 kV, ±8 kV, ±15 kV air	±8 kV contact ±2 kV, ±4 kV, ±8 kV, ±15 kV air	Floors should be wood, concrete, or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	±2 kV 100 kHz repetition frequency	±2 kV 100 kHz repetition frequency	Mains power quality should be that of a typical commercial or hospital environment.

Table 2-6 Electromagnetic immunity (Table continued)

Immunity test	IEC 60601-1-2 test level	Compliance level	Electromagnetic environment guidance
Surge IEC 61000-4-5	Differential Mode ±0.5 kV, ±1 kV	Differential Mode ±0.5 kV, ±1 kV	Mains power quality should be that of a typical commercial or hospital environment.
	Common Mode ±0.5 kV, ±1 kV, ±2 kV	Common Mode ±0.5 kV, ±1 kV, ±2 kV	
Voltage dips IEC 61000-4-11	0% U_T : 0.5 cycle At 0°, 45°, 90°, 135°, 180°, 225°, 270°, and 315°	0% U_T : 0.5 cycle At 0°, 45°, 90°, 135°, 180°, 225°, 270°, and 315°	Mains power quality should be that of a typical commercial or hospital environment. If the user of the device requires continued operation during power mains interruptions, it is recommended that the device be powered from an uninterruptible power supply.
	0% U_T : 1 cycle and 70% U_T ; 25/30 cycles Single phase: at 0°	0% U_T : 1 cycle and 70% U_T ; 25/30 cycles Single phase: at 0°	
Voltage interruptions IEC 61000-4-11	0% U_T ; 250/300 cycles	0% U_T ; 250/300 cycles	
Power frequency (50/60 Hz) magnetic field environment IEC 61000-4-8	30 A/m 50 Hz or 60 Hz	30 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

NOTE

U_T is the main voltage before application of the test level.

2.7.5 International Electronic Commission (IEC) guidance and manufacturer’s declaration regarding electronic immunity

The warmer is intended for use in the environment specified as follows.

Table 2-7 IEC electromagnetic immunity

Immunity test	IEC 60601-1-2 test level	Compliance level	Electromagnetic environment guidance
Conducted RF IEC 61000-4-6	3 Vrms 6 Vrms in ISM bands between 0.15 MHz and 80 MHz 80% AM at 1 kHz	3 Vrms 6 Vrms	Portable and mobile RF communications equipment should be used no closer to any part of the warmer, including cables, than the recommended separation distance calculated from the equation applicable for the frequency of the transmitter. Recommended separation distance: $d=1.2\sqrt{P}$ Radiated RF can affect the accuracy of in-bed scale readings. However, the in-bed scale is not critical to the performance of the warmer unit.*1 $d=1.2\sqrt{P} = 26 \text{ MHz to } 800 \text{ MHz}$ $d=2.3\sqrt{P} = 800 \text{ MHz to } 2.7 \text{ GHz}$ where P is the maximum output power rating of the transmitter in watts (W) according to
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2.7 GHz 80% AM to 1 kHz Compliance to Table 9 of IEC 60601-1-2:2014 / EN 60601-1-2:2015	3 V/m	

Table 2-7 IEC electromagnetic immunity (Table continued)

Immunity test	IEC 60601-1-2 test level	Compliance level	Electromagnetic environment guidance
IEC 60601-2-21	3 V/m 26 MHz to 1 GHz 10 V/m 26 MHz to 1 GHz	3 V/m normal operation 10 V/m no hazard	the transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths for fixed RF transmitters as determined by an electromagnetic site survey ^{*2} should be less than the compliance level in each frequency range. ^{*3} Interference may occur in the vicinity of equipment marked with the following symbol: (((•))) ▲

*1 Portable and mobile equipment can affect medical electronic equipment.

*2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.

Field strengths from fixed transmitters such as base stations for radio, cellular/cordless telephones and land mobile radios, amateur radios, AM and FM radio broadcasts, and TV broadcasts cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the warmer unit is used exceeds the applicable RF compliance level above, the unit should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the warmer.

*3 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.

Over the frequency range 150 KHz to 80 MHz, field strengths should be less than 3 V/m.

NOTE

At 80 MHz and 800 MHz, the higher frequency applies.

2.7.6 Recommended separation distance between portable and mobile RF communications equipment and the system

The system is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The user can prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the system as recommended as follows, according to the maximum output power of the communications equipment.

Table 2-8 Separation distance

Rated maximum output power of transmitter (W)	Separation distance in meters (m) according to frequency of transmitter		
	150 kHz to 80 MHz $d = 1.2\sqrt{P}$	80 MHz to 800 MHz $d = 1.2\sqrt{P}$	800 MHz to 2.7 GHz $d = 2.3\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1.0	1.2	1.2	2.3
10.0	3.8	3.8	7.3
100.0	12.0	12.0	23.0

For transmitters rated at a maximum output power not listed above, the recommended separation distance (d) in meters (m) can be determined using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and persons.

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Chapter 3 Installation and service checkout

3.1 Installation procedures

Installation is only necessary for the Panda wall-mounted warmer model. For the Panda wall-mounted warmer model, refer to [3.1.1 Installing wall mount devices on page 61](#) to mount and secure the device on the wall and align the heater.

3.1.1 Installing wall mount devices

To adequately install the wall mount warmer, pre-planning at the architectural design phase is required. The following instructions describe the manufacturer's recommended method of installation in new construction. Use only the GE Healthcare hardware provided to mount the wall mount warmer model. The installation should be approved by the appropriate authorities. Deviation from these recommendations or attempts to retrofit existing construction should only be undertaken by professionals experienced in structural design, who in turn are wholly responsible for the structural integrity of the mounting method they devise.

NOTE

Mounting the wall mount bracket and the bumper on the wall is not the responsibility of GE Healthcare service personnel. The hospital or the medical facility shall arrange for the completion of bracket and bumper mounting task. The GE Healthcare service personnel are responsible for installing the heater head only after the bracket is securely mounted on the wall at the specified distance from the floor.

WARNING



PERSONNEL INJURY HAZARD

Make sure you install all 4 wall-mount bracket bolts through the wall track for the warmer to be stable.

WARNING



PERSONNEL OR PATIENT INJURY HAZARD

Make sure you install the wall-mount warmer to the instruction specifications.

If you do not install the wall-mount warmer correctly, it can fall off the wall.

The wall mount warmer installation includes 5 major tasks:

- Installation of the wall mount bracket on the wall - To be done by the hospital
- Installation of the bumper on the wall - To be done by the hospital
- Installation of the heater head - To be done by authorized service personnel
- Heater alignment - To be done by authorized service personnel
- Installation of mattress height label - To be done by authorized service personnel

3.1.1.1 Pre-installation preparation

WARNING

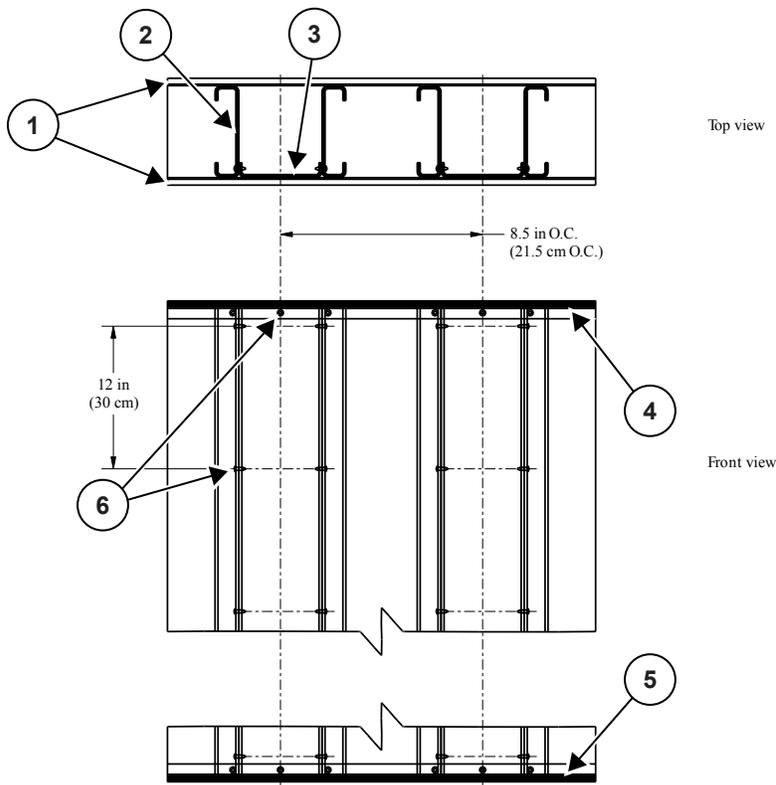


PERSONNEL OR PATIENT INJURY HAZARD

If the hospital uses a wall design other than that specified in this procedure, the wall mount bracket must be tested with a load of 131 lbs (59.4 kg). This load is 4 times the weight of the wall-mount warmer.

The wall mount bracket needs to be installed on a flat-surfaced wall with drywall being 5/8 inch (1.6 cm) or thicker. A pattern of 2 drywall studs (25 gage minimum) and 1 drywall track (25 gage minimum) at 8.5 inch (21.5 cm) centers form the basic “rough in” for installing each wall mount warmer device (See [Figure 3-1 Wall cross section on page 62](#)). Verify that the studs and track are securely fastened together at 12 inch (30.5 cm) intervals and to both the floor and ceiling tracks with #10 sheet metal screws.

Figure 3-1 Wall cross section



1	Drywall
2	Stud
3	Track
4	Ceiling track
5	Floor track
6	Sheet metal screws

3.1.1.2 Wall mount bracket installation

WARNING**PERSONNEL INJURY HAZARD**

Make sure you install all 4 wall-mount bracket bolts through the wall track for the warmer to be stable.

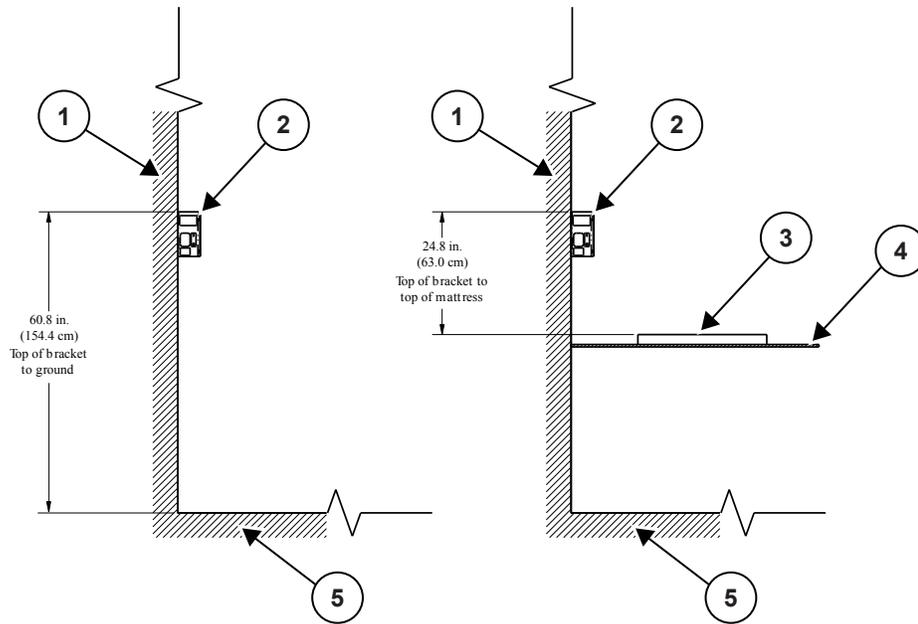
CAUTION**PATIENT INJURY HAZARD – HYPOTHERMIA OR HYPERTHERMIA**

Make sure you install the wall bracket to the instruction specifications. If you do not install the bracket correctly, this can cause the heater not to be correctly aligned with the bassinet.

After the wall is finished and the room is completed, you are ready to install the wall mount bracket.

1. Utilizing a level, position the wall mount bracket on the wall and confirm that the bracket is both horizontally and vertically leveled.

The bracket shall be positioned on the wall such that the 4 bracket holes be placed on the center of the wall tracks and the top edge of the wall mount bracket must be 60.8 inches \pm 0.1 inch (154.4 cm \pm 0.25 cm) from the floor for installations to be used with bassinets, and 24.8 inches \pm 0.1 inch (63 cm \pm 0.25 cm) from the fixed surface for installations to be used with fixed surface (see [Figure 3-2 Positioning of wall mount bracket on page 64](#)).

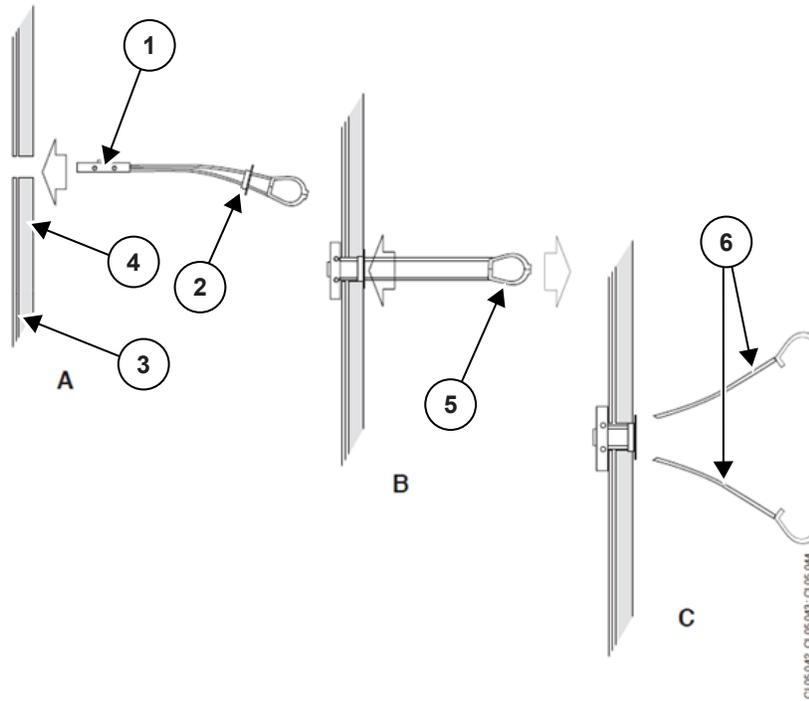
Figure 3-2 Positioning of wall mount bracket

1	Wall
2	Wall mount bracket
3	Mattress
4	Fixed surface
5	Floor

2. Use the wall mount bracket as a template to mark the mounting holes on the wall.
3. Use a 3/4 inch (19 mm) diameter metal cutting hole saw or drill 4 holes through the dry wall and through metal tracks behind the drywall.
4. Perform [Step 4.a](#) through [c](#) to secure the 4 Toggler® anchor bolts (6600-0413-400) in the wall. See [Figure 3-3 Anchor installation on page 65](#).
 - a. Hold the metal channel flat alongside the plastic straps and slide the channel through the hole in the wall and track.
 - b. With 1 hand, hold the ring so the metal channel rests flush behind the wall. Slide the plastic cap along straps with the other hand until the flange of the cap is flush with the wall.

- c. Place your thumb between the straps, and push from side to side, snapping off the straps level with the flange of the cap.

Figure 3-3 Anchor installation

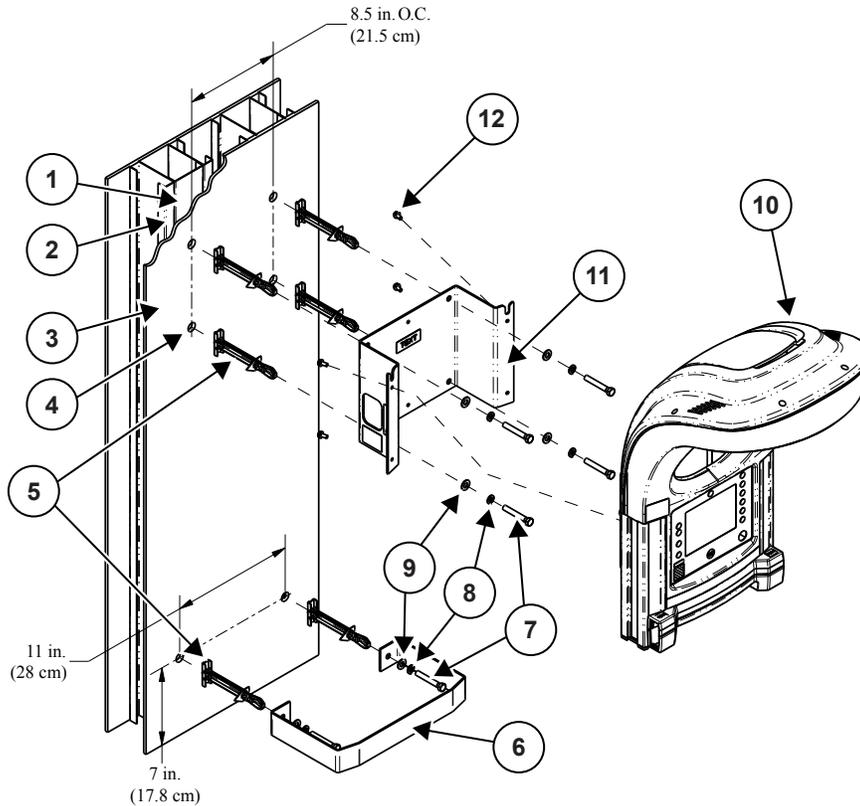


1	Metal channel
2	Cap
3	Track
4	Drywall
5	Ring
6	Straps

- 5. Mount the wall mount bracket on the wall with the flat washers (6600-0173-400), split ring washers (6600-0440-400), and screws (6600-0414-400) provided (see [Figure 3-4 Wall mounting on page 66](#)). Tighten the screws with approximately 80 lb-in of torque.

NOTE

When a wall mount bracket is replaced, make sure to transfer the warmer device serial number on to the blank label provided on the new bracket.

Figure 3-4 Wall mounting

Callout	Description	Orderable service part number
1	Track	N/A
2	Stud	N/A
3	Drywall	N/A
4	ø 3/4 inch (ø 1.9 cm) hole	N/A
5	Toggler anchor bolt	6600-0413-400*1
6	Wall bumper	N/A
7	Hex head screw	6600-0414-400*1
8	Split lock washer	6600-0440-400*1
9	Flat washer	6600-0173-400*1
10	Wall mount warmer system	N/A
11	Wall mount bracket	N/A
12	M6 screw with captive washers	M1110521

*1 Replacement parts are also orderable through Bracket FRU Kit and Bumper FRU Kit. See [7.8 Wall mount model parts on page 200](#) for details.

NOTE

The screws provided (3/8 - 16 UNC, 2 1/2 inch long) are for installations in 1/2 inch or 5/8 inch thick drywall. For applications involving double thicknesses of drywall, longer screws will be required. To properly mount the warmer, at least 2 screw threads must be engaged.

3.1.1.3 Bumper installation

The bumper is intended to help the clinician properly position the bassinet during use. Bassinets are available in many different sizes and configurations. Confirm that the center of the mattress is 19 inches (48.3 cm) away from the front of the rails on the warmer with the bumper installed. If the included bumper is not the right dimension for the facility's bassinets, the facility may use an alternative bumper design to ensure proper positioning.

1. Position the bumper on the wall such that it is leveled horizontally and its center is aligned with the center of wall mount bracket and the bumper holes are 7 inches (17.8 cm) from the floor.

For bassinets with a bumper being at a height different from 7 inches (17.8 cm), the bumper distance from the floor can be adjusted to match the bassinet bumper height.

2. Use the bumper as a template to mark the mounting holes on the wall.
3. Use a 3/4 inch (19 mm) diameter metal cutting hole saw or drill 4 holes through the drywall and through metal drywall tracks behind the wall.
4. Secure the 2 Toggler® anchor bolts as instructed in step 4 of [3.1.1.2 Wall mount bracket installation on page 63](#).
5. Mount the bumper on the wall with the flat washers (6600-0173-400), split ring washers (6600-0440-400), and screws (6600-0414-400) provided (see [Figure 3-3 Anchor installation on page 65](#)). Tighten the screws with approximately 80 lb-in of torque.

3.1.1.4 Heater head installation and heater alignment

WARNING



PERSONNEL INJURY HAZARD

Obey local health and safety regulations for lifting heavy objects. The warmer base weighs 22 kg and the heater head weighs 15 kg.

CAUTION



PATIENT INJURY HAZARD – HYPOTHERMIA OR HYPERTHERMIA

Make sure the warmer head and wall bracket serial numbers match. If you install a warmer head on a different bracket, this can cause the heater not to be correctly aligned with the bassinet.

1. Before installing the heater head, confirm that the device serial number on the rear side of the head matches with the serial number on the wall bracket.
2. Confirm the wall mount bracket is positioned correctly.
 - For installations to be used with bassinets, verify that the top edge of the bracket is 60.8 inch \pm 0.1 inch (154.4 cm \pm 0.25 cm) from the floor. See [Figure 3-2 Positioning of wall mount bracket on page 64](#).
 - For installations to be used with fixed surfaces, verify that the top edge of the bracket is 24.8 inch \pm 0.1 inch (63 cm \pm 0.25 cm) from the floor. See [Figure 3-2 Positioning of wall mount bracket on page 64](#).

3. The steps below are required to perform heater alignment which is necessary upon installation of wall mount models:

NOTE

Heater alignment is not required if heater head is re-installed on its corresponding wall bracket on which the heater has been aligned before.

- a. Remove the upper heating housing as instructed in [8.3.1 Upper heater housing removal on page 230](#) to access the heater alignment screws.
- b. Mount the heater head by inserting the shoulder screws on the back of the header head into their corresponding bracket slots on the wall bracket. Install the 4 M6 button head screws.
- c. Fit the alignment laser in to the laser holder. Turn the laser about 1/8th turn to seat it in the bore of the laser holder.
- d. Locate and mark the alignment spot as illustrated in [Figure 8-8 Locating alignment point for wall-mounted models used with bassinet on page 238](#).

For installations to be used with bassinets, the alignment spot shall be at 40.5 inch \pm 0.1 inch (103 cm \pm 0.25 cm) distance from the wall and at 0.75 inch \pm 0.1 inch (1.9 cm \pm 0.25 cm) distance from the center of the warmer device.

For installations to be used with fixed surfaces, the alignment spot shall be at 25.75 inch \pm 0.1 inch (65 cm \pm 0.25 cm) distance from the wall in line with the center of the warmer device.

NOTE

Use a laser level (with 2 wall leveling capability) or a combination of T-square and Plumb-bob to locate the alignment spot accurately (see [Figure 3-5 Laser-level or Plumb-bob & T-square used to locate the alignment spot on the floor on page 69](#) and [Figure 3-6 Laser-level or Plumb-bob & T-square used to locate the alignment spot on a fixed surface on page 70](#)).

NOTE

Make sure the alignment spot location is measured from the wall, not the baseboard.

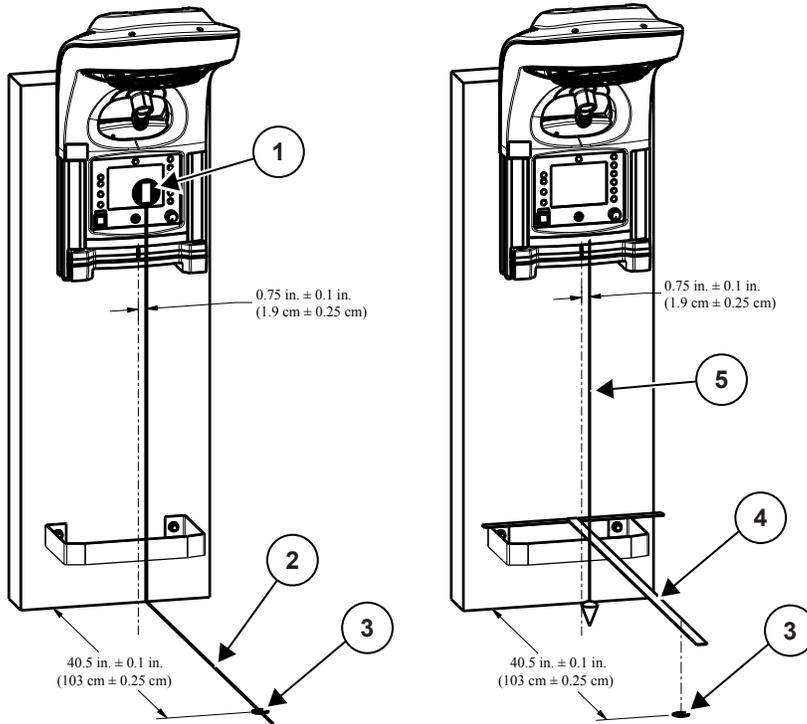
- e. Use a long 3 mm hex key to adjust the dish's 3 adjustment screws located in the bosses underneath the cotter pins.

Loosening or tightening the 2 screws on either side will move the laser spot from left to right, with longitudinal shift, and adjusting the screw in back moves the spot up and down in the target. Adjust the side screws first, then adjust the bottom screw, so that the laser spot is on the marked alignment spot on the floor.

- f. Remove the 4 M6 button head screws. Lift the heater head up slightly to release the shoulder screws from the bracket slots and remove the head from the bracket.
- g. Place the heater head on a flat surface and re-install the upper heating housing.

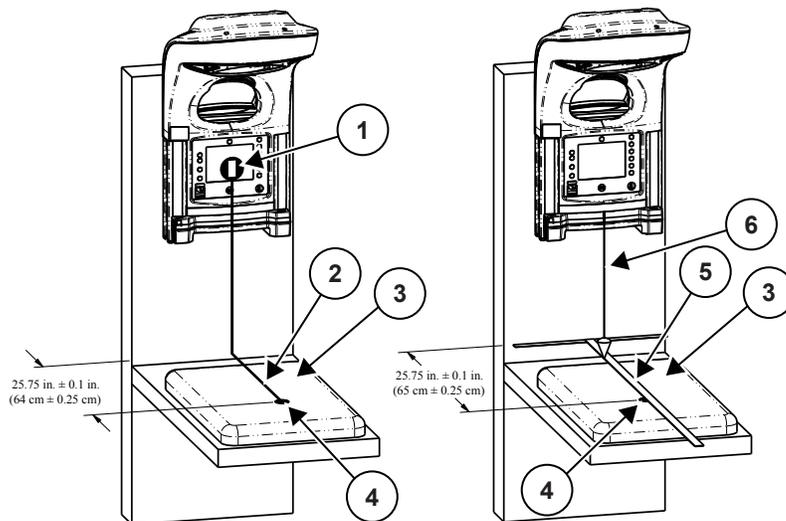
4. Mount the heater head by inserting the shoulder screws on back of the head into their corresponding bracket slots. Secure the bracket to the heater head using the 4 M6 button head screws provided.

Figure 3-5 Laser-level or Plumb-bob & T-square used to locate the alignment spot on the floor



1	Laser level
2	Laser beam
3	Alignment spot
4	T-square
5	Plumb-bob

Figure 3-6 Laser-level or Plumb-bob & T-square used to locate the alignment spot on a fixed surface



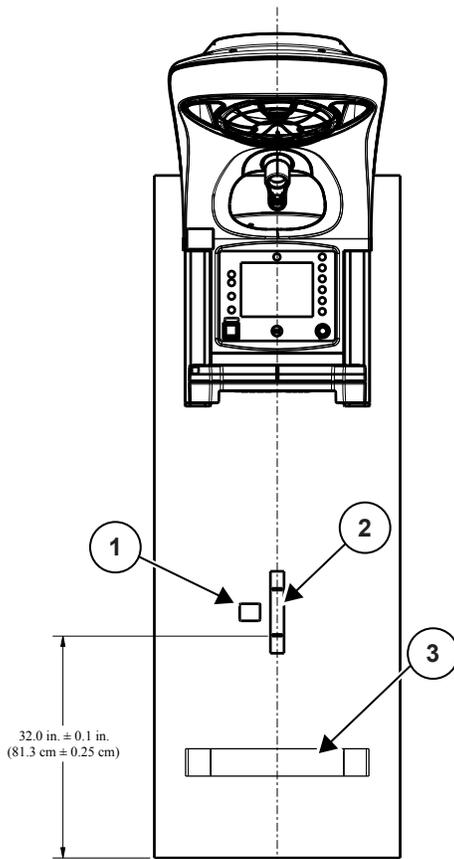
1	Laser level
2	Laser beam
3	Mattress
4	Alignment spot
5	T-square
6	Plumb-bob

3.1.1.5 Mattress height label installation

1. Install 1 mattress height label on the wall as shown in [Figure 3-7 Mattress height label installation on page 71](#). Place the bottom bar of the label (indicating the minimum height) at 32 inch \pm 0.1 inch (81.30 cm \pm 0.25 cm) from the floor and vertically center align the label with the center of the warmer head.

2. Install 1 mattress height warning label next to the mattress height label on the wall.

Figure 3-7 Mattress height label installation



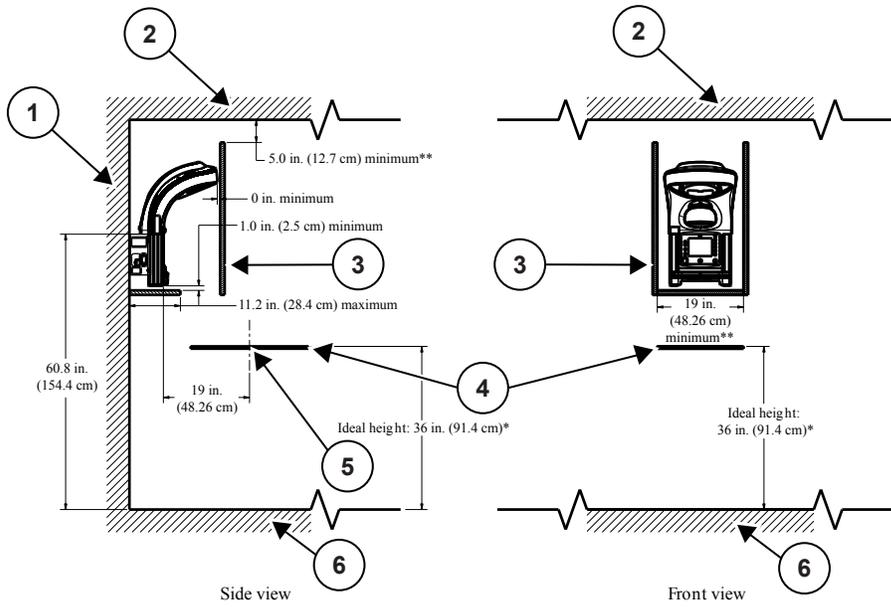
1	Mattress height warning label
2	Mattress height label
3	Bumper

3.1.1.6 Enclosure dimensional specification

GE Healthcare does not offer an in-built bed, cabinet, or other enclosure option for this device. If the facility chooses to place the device in an enclosed space (for example, a cabinet or armoire), make sure that the enclosure meets the minimum dimensional requirements as illustrated in [Figure 3-8 Minimum dimensional requirements for the enclosure on page 72](#) in order to have adequate air flow to avoid the device overheating when the enclosure is closed. During use (when the enclosure is open), confirm that no object is blocking the radiant heat path to the bed (see [Figure 3-10 Radiant heat path on page 74](#)) and that the caregiver can have unobstructed access to the device control panel, probe panel, rails, and the bed surface. Do not operate the device unless the cabinet, armoire, or other enclosure is open (see [Figure 3-11 Schematic showing unobstructed area access during use on page 75](#)). GE Healthcare will not install a device in an enclosure that does not provide the caregiver with unobstructed access to the device control panel, probe panel, rails, and the bed surface. The facility’s installation of, or operation of, the device in such an enclosure is at the facility’s risk.

The following dimensions apply when the device is not being operated:

Figure 3-8 Minimum dimensional requirements for the enclosure



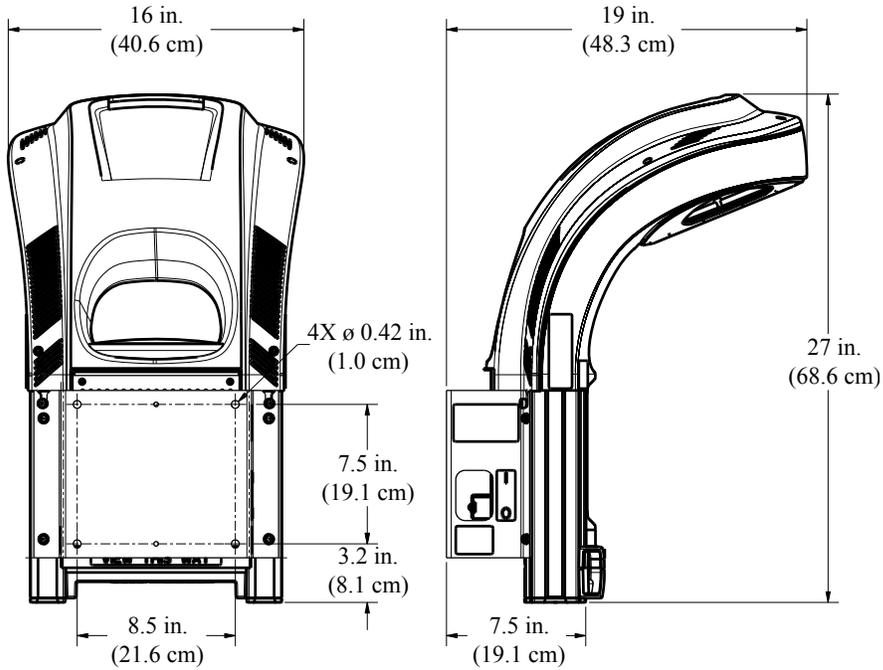
1	Wall
2	Ceiling
3	Enclosure
4	Bed surface
5	Bed center
6	Floor

* Acceptable range for bed height:

- Minimum height: 32.0 in. ± 0.1 in. (81.3 cm ± 0.25 cm)
- Maximum height: 39.2 in. ± 0.1 in. (99.6 cm ± 0.25 cm)

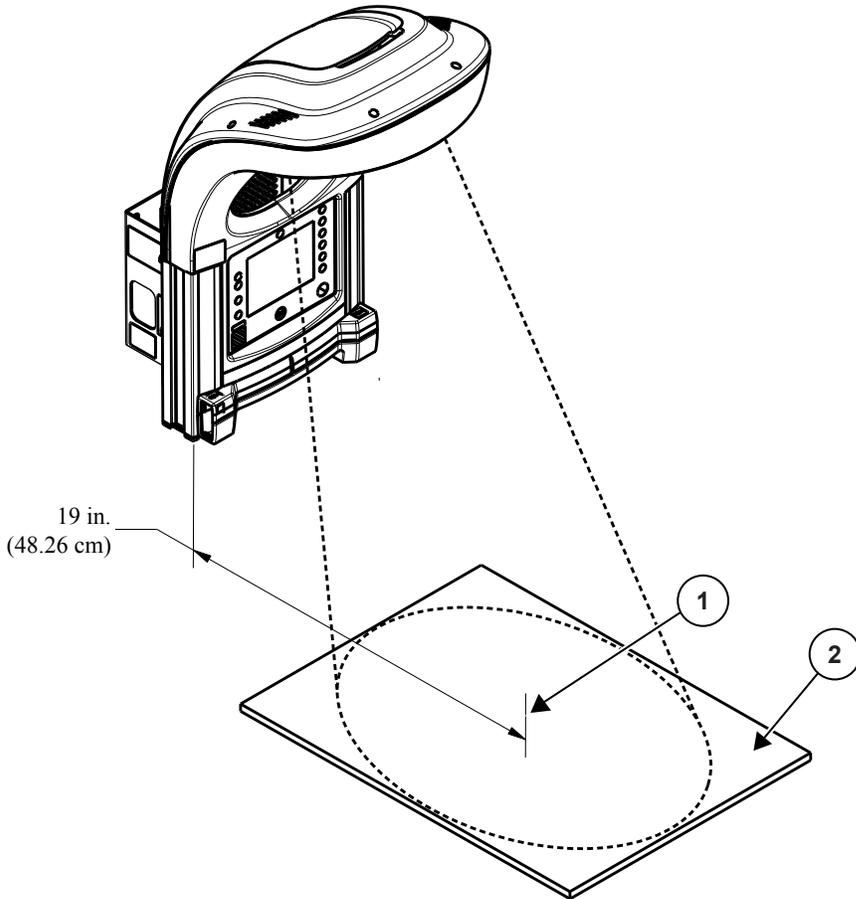
** For repairs, the device needs to be removed from the wall bracket and then re-installed on the bracket. Make sure to provide sufficient spacing to let the service technician access the 2 bracket screws on each left-rear and right-rear sides of the device and lift the header head to release it from the bracket.

Figure 3-9 Dimensions of wall mount device



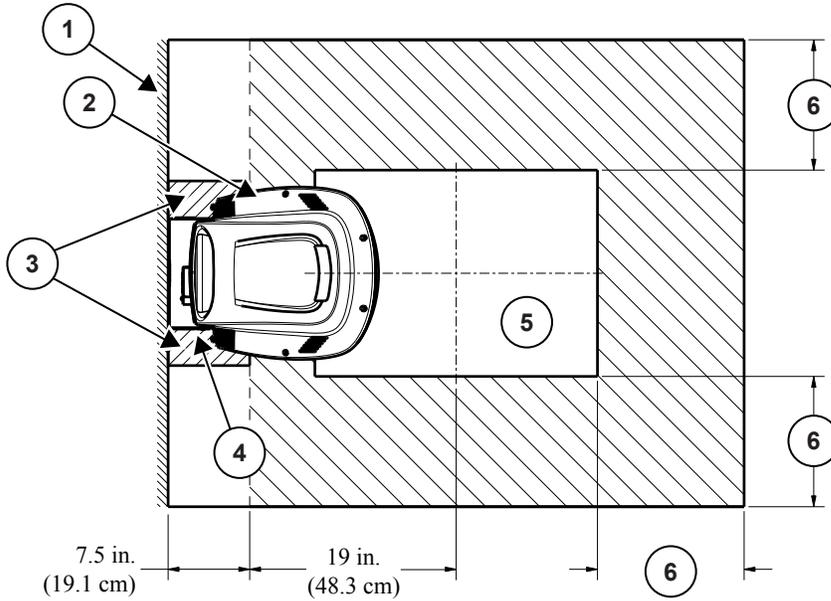
The following dimensions apply when the device is being operated:

Figure 3-10 Radiant heat path



1	Bed center
2	Bed surface

Figure 3-11 Schematic showing unobstructed area access during use



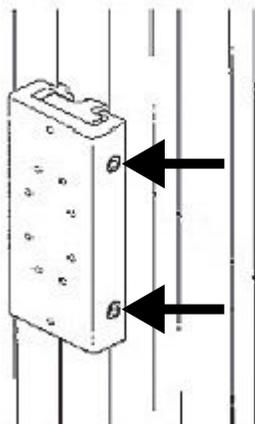
1	Mounting surface
2	Heater head
3	For repairs, the device needs to be removed from the wall bracket and then re-installed on the bracket. Make sure to provide sufficient spacing in the shaded area to give the service technician unobstructed access to the 2 bracket screws on each left-rear and right-rear sides of the device.
4	Mounting bracket
5	Mattress
6	Confirm that the caregiver has unobstructed access to this region during device operation. Actual dimensions are facility-specific and thus must be determined by the facility prior to device operation.

3.1.2 Mounting universal adapter plate

The universal adapter plate lets you mount bottle slides and more brackets to the rail system.

1. Loosen the 2 mounting screws on the side of the adapter plate with the hex key supplied with the plate.

Figure 3-12 Mounting screws for universal adapter plate



2. Put the adapter plate in position on the rail.
3. Tighten the 2 mounting screws.

To release the adapter plate, loosen the mounting screws.

3.1.3 DIN rail upgrade installation instructions

Parts required

M1143466 DIN rail upgrade

For information about how to attach rail clamps and lock them in place and how to connect an equipment mount to the DIN rail, refer to the instructions from the manufacturer of the equipment that you will attach to the DIN rail.

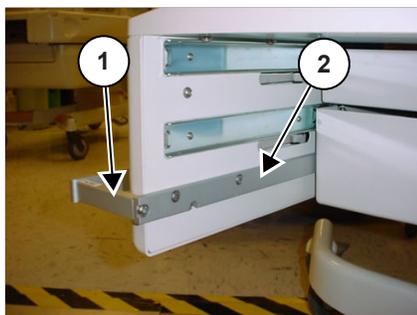
1. Unpack the DIN rail assembly and bagged hardware.
2. Inspect for visible shipping damage.
3. If the device to be upgraded has a 1 or 2 drawer storage system, attach the DIN rail with the included hardware. If the device to be upgraded has a storage shelf, the DIN rail assembly will need to be disassembled before mounting.

Table 3-1 Device storage

1 drawer	2 drawer	Shelf
		

4. 1 or 2 drawer storage only:
 - a. Lift the DIN rail to the front of the storage package and use the set of 4 included washers and screws to mount the DIN rail.
 - b. Make sure that the label is facing up and the screw recesses are oriented down.

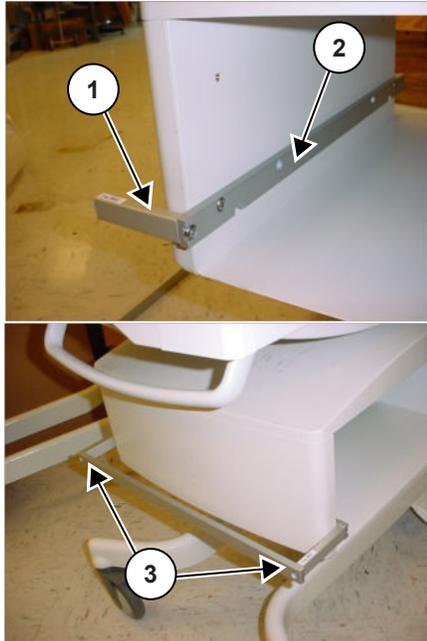
Figure 3-13



1	Label on top
2	Note orientation of screw recess

5. Shelf storage only:
 - a. Unscrew the 2 screws holding the DIN rail to the DIN rail assembly.

- b. Mount the remaining DIN rail assembly such that the label is facing up, using 2 of the included washers and screws.
- c. Reattach the DIN rail to the rest of the assembly using those screws removed from it in [Step 5.a](#).

Figure 3-14

1	Label on top
2	Note orientation of screw recess
3	Re-install DIN rail to assembly

6. Inspect all screws to ensure that they are tight.

3.1.4 Resuscitation upgrade kit installation

This instruction is applicable to the following resuscitation upgrade kits:

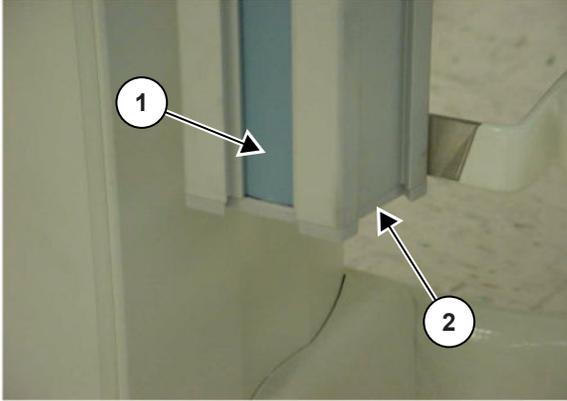
- Resuscitation Upgrade Kit 1, T-Piece with Blender and Yokes
- Resuscitation Upgrade Kit 2, T-Piece without Blender or Yokes
- Resuscitation Upgrade Kit 3, T-Piece with Blender and without Yokes
- Resuscitation Upgrade Kit 4, Bag and Mask with Blender and Yokes
- Resuscitation Upgrade Kit 5, Bag and Mask without Blender or Yokes
- Resuscitation Upgrade Kit 6, Bag and Mask with Blender and without Yokes

3.1.4.1 Upgrade instructions

1. Unpack the resuscitation module.
2. Remove the protective plugs.
3. Inspect for visible shipping damage.

4. Check to make sure included parts match bill of material for the kit ordered.
Refer to Resuscitation upgrade kits.
5. Remove the end caps from the rails by prying them with screwdriver.
You can also remove them by hand without a tool.

Figure 3-15 End cap



1	Plastic strip
2	End cap

Figure 3-16 End cap removal with screwdriver



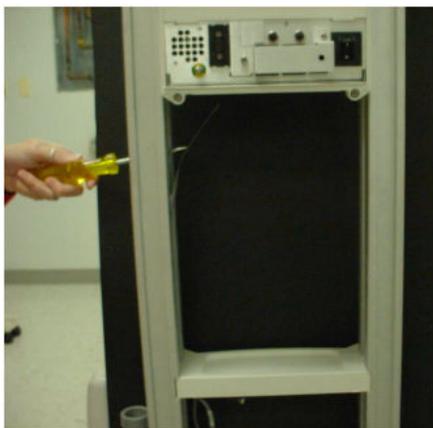
- Slide the plastic strip down, enough to expose the resuscitation box mounting screw holes.

Figure 3-17 Resuscitation box mounting screw holes



- Remove the aluminum-colored cover strips from the inside surface of the rails.
There is 1 cover strip on each rail. They can be removed by pushing a screwdriver through a screw hole.

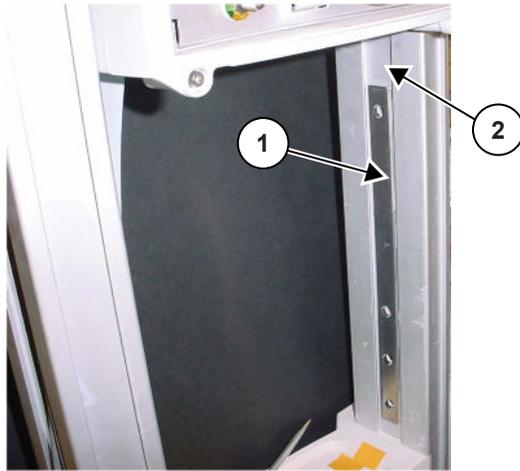
Figure 3-18 Cover strip removal with screwdriver



- Discard the cover strips.
- Install 2 Resus Mounting Spacers (6600-2137-500).
 - Peel backing to expose adhesive and adhere to inside rail surface.

- b. Make sure the holes in the spacers align with the center of the slots in the rail.

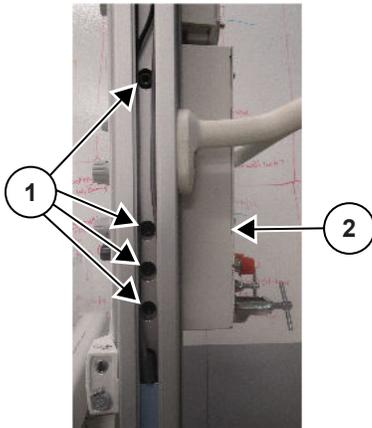
Figure 3-19 Spacer adhered to inside rail surface



1	Spacer
2	Inside rail surface

10. Install the replacement resuscitation box by sliding it in from the rear of the device. This will reduce the chance of scratching the paint on the resuscitation box sheet metal.

Figure 3-20 Resuscitation box installation



1	Screw locations
2	Box installation direction

11. Install 4 M8X20 Socket Flange Lock Screws (6600-1295-400), but leave loose. If your device has yokes, install 8 M8X20 Socket Flange Lock Screws instead.

12. Lift the resuscitation module so that there is no gap between the resuscitation module and heater head.

Figure 3-21 Minimized gap

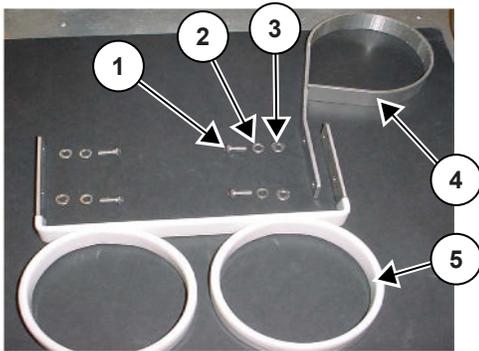


13. Tighten the 4 or 8 mounting screws to 200 ± 30 lb-in.
14. Install the suction canister holder (6600-2149-500) and the cylinder guard (optional).

The cylinder guard is provided only if the resuscitation module has yokes installed.

All kits come with size E-cylinder guard (6600-2135-500) except for kits ordered with Australian fittings, which come with size C-cylinder guard (M1143834).

Figure 3-22 Suction canister holder and cylinder guard

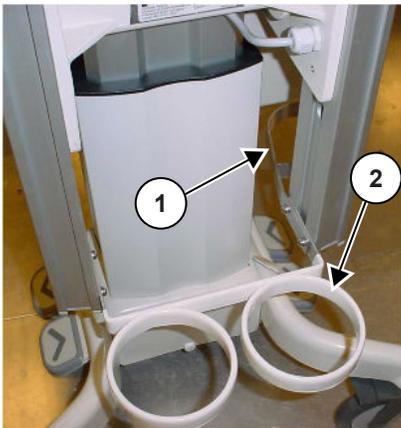


1	2X (4X optional) 6600-0706-428 M6x16 BTN HD SCR
2	2X (4X optional) 6600-0713-405 M6 SPLK WSHR
3	2X (4X optional) 6600-0712-405 M6 FLT WSHR
4	Suction canister holder (6600-2149-500)
5	Cylinder guard (optional)

Figure 3-23 Suction canister holder only



Figure 3-24 Suction canister holder and E-cylinder guard option



1	Suction canister holder
2	E-cylinder guard

15. Install the 800cc canister (M1064655) by placing it in the suction canister holder.

Figure 3-25 Canister in suction canister holder



16. Route the 1/4 ID vacuum hose (M1118195) and attach the ends to the 800cc canister and resuscitation module.

Figure 3-26 Hose connected to barb and routed to outside of rail



Figure 3-27 Hose routed back to inside of rail and connected to canister



17. Slide up the plastic strip and snap-in the end cap on both rails.

18. Install the Bag and Mask holder (6600-2150-500) on the rail in the approximate location that the Bag and Mask or T-piece is likely to be located.

In some cases, a screwdriver is needed for leverage when installing. Rotate the holder counterclockwise only.

Figure 3-28 Bag and Mask holder installation



Figure 3-29 Correct orientation of Bag and Mask holder



19. Perform the resuscitation module functional checkout as described in Chapter 2 of the Resuscitation Service Manual (M1128929).

3.2 Service checkout procedures

WARNING



PATIENT OR USER INJURY HAZARD

Do not do the pre-use checkout procedure, service, or calibrate the device with the patient in the device. Make sure all pre-use checkout procedure steps are correctly completed before each patient use. If a step fails, do not use the device.

WARNING



PATIENT INJURY HAZARD

You must do the pre-use checkout procedure before you put the patient in the device. Verify that the audio and visual alarms come on.

Make sure that all covers are fully installed before you do a checkout procedure.

NOTE

After you remove the device from the shipping package, do all necessary installation, and clean the device (refer to the user manual), do the checkout procedures that follow before you put the device into operation.

3.2.1 Mechanical checks

**WARNING****PERSONNEL OR PATIENT INJURY HAZARD**

Only use options, accessories, power cords, and replacement parts that are specified by the manufacturer. Options, accessories, power cords, or replacement parts not approved by the manufacturer can cause injury to the patient or user, cause the device to not operate correctly, or cause damage to the device.

**WARNING****PERSONNEL INJURY HAZARD - BURN OR ELECTRIC SHOCK**

Inspect the power cord carefully and do not operate the device with a damaged power cord.

If you use a damaged power cord, it can give you an electrical shock or burn your skin.

Replace the power cord if it is damaged.

**WARNING****PATIENT FALL HAZARD**

You must do the pre-use checkout procedure before you put the patient in the device.

Make sure that the 4 bedside panels operate correctly. If a bedside panel does not operate correctly or is damaged, replace the bedside panel before you put the patient in the device.

**WARNING****PATIENT INJURY HAZARD**

You must do the pre-use checkout procedure before you put the patient in the device.

Make sure that the bed tilt mechanism operates and locks correctly before you put the patient in the bed.

**WARNING****PATIENT INJURY HAZARD**

You must do the pre-use checkout procedure before you put the patient in the device.

Make sure that the casters operate and lock correctly before you put the patient in the bed.

**WARNING****PATIENT INJURY HAZARD**

Inspect the device carefully and do not use it if it is dirty or has visible debris, is damaged, or has missing parts.

Before each use, carefully inspect the following accessories to make sure they are clean and not damaged:

- Temperature probe and cables
- Resuscitation accessories
- SpO2 sensors and cables (do not use the sensor if you can see the optical components)
- Mattress (check the entire mattress for rips)

**WARNING****PATIENT FALL HAZARD**

You must do the pre-use checkout procedure before you put the patient in the device. Do not use Panda iRes Warmer bedside panels with a Giraffe Warmer. The Panda iRes Warmer and Giraffe Warmer bedside panels are different heights.

**WARNING****PERSONNEL INJURY HAZARD - ELECTRIC SHOCK HAZARD**

Verify the power cord retainer behind the control panel is installed. If the retainer is not installed, the power cord can pull out from the power inlet and cause loss of power to the warmer.

**CAUTION****PATIENT INJURY HAZARD - DELAY IN CARE**

You must connect the device to a hospital grade power outlet. If you connect through a different device or a power strip, this can cause the warmer to lose power.

**CAUTION****PERSONNEL INJURY HAZARD**

Do not hold the bedside panel closest to the probe panel when you tilt the bed in the direction of the probe panel. If you hold the bedside panel when you tilt the bed, your hand can be pinched between the bedside panel and the probe panel.

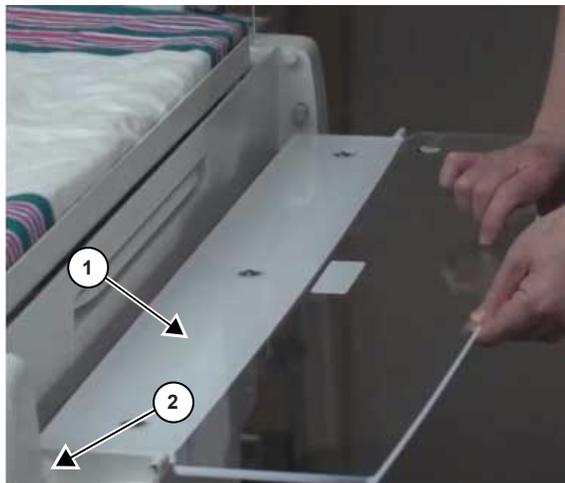
1. Set the power standby switch on the left side of the control panel to OFF.
2. Set the mains power switch behind the control panel to OFF.
3. Disconnect the power cord from the power outlet for the mechanical part of the preoperational checkout procedure.
4. Inspect the power cord for damage. Replace the power cord if it is damaged.
5. Make sure that the power cord retainer behind the control panel is installed.

6. Inspect the device for dirty, damaged, or missing parts.
Inspect the chassis for cracks.
7. Examine the device for damaged or missing labels. Make sure that the labels are attached in the correct locations. For a list of labels and their correct locations, see [7.13 Labels on page 216](#).
8. For bedded and freestanding models, make sure that the casters and brakes operate correctly.
 - a. Make sure that all the casters touch the floor and that the device is stable.
 - b. Lock all the brakes and make sure that the brakes hold the device in position.

NOTE

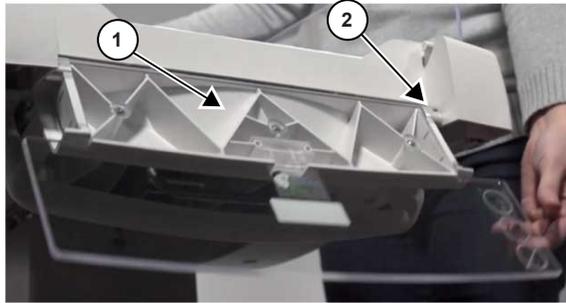
You can push on the maneuvering handle to do this check. Also, you can use this step to look for loose parts or excessive movement in the bed frame.

- c. Release all the brakes and make sure that the device moves smoothly.
9. Examine all the bedside panels and make sure that the bedside panels are the new models.
 - a. Lower the bedside panels so you can see the inner part of the panel and the latches.
The old bedside panel models have a white inner panel and plastic latches.

Figure 3-30 Old bedside panel model

1	White inner panel
2	Plastic latch

The new bedside panel models have a transparent inner panel and metal latches.

Figure 3-31 New bedside panel model

1	Transparent inner panel
2	Metal latch

- b. If the bedside panels are the old models, replace the bedside panels with the new models.
10. Examine the bedside panels, the latch area, and the area that connects the bedside panel to the bed for cracks or damage. If a part of the bedside panels or latches has a crack or is damaged, replace the bedside panel.
11. For bedded models, make sure that all 4 bedside panels operate correctly.

You must only be able to lower the side and front bedside panels if you pull the bedside panel up and then pull the top edge of the bedside panel away from the bed. You must only be able to remove the rear bedside panel if you push the release button and pull the bedside panel up.
12. For bedded models, make sure that the bed tilt mechanism operates correctly.
 - a. Pull the tilt lever and push down on the front end of the bed. Make sure that the rear end of the bed lifts easily.
 - b. Pull the tilt lever and pull up on the front end of the bed. Make sure that the rear end of the bed lowers easily.
 - c. Release the tilt lever. Make sure that the bed locks in that position.

The bubble levels on the side bedside panels show if the mattress is level.
13. Make sure that the procedure light assembly (if equipped) moves smoothly and that you can point the light at each corner of the mattress.
14. For freestanding models, inspect the fasteners that attach the rails, the mounting blocks, and the base together to make sure that the joints are secure and tight.
15. For wall-mounted models, make sure that the bracket is securely mounted on the wall and all the screws that attach the heater head to the bracket are tight.

3.2.2 Controller checks

WARNING



PATIENT INJURY HAZARD

You must do the pre-use checkout procedure before you put the patient in the device.

Make sure that the bed elevation mechanism on each side of the bed operates correctly before you put the patient in the bed.

WARNING**PATIENT INJURY HAZARD**

You must do the pre-use checkout procedure before you put the patient in the device.
Verify that the audio and visual alarms come on.

CAUTION**PATIENT INJURY HAZARD - DELAY IN CARE**

You must do the pre-use checkout procedure before you put the patient in the device.

Make sure you see the control panel screen and the indicator light come on when you set the power standby switch to ON. If you do not see the control panel screen or the indicator light come on, do not use the device.

CAUTION**PATIENT INJURY HAZARD - DELAY IN CARE**

You must do the pre-use checkout procedure before you put the patient in the device.

Make sure you hear the POST (Power On Self Test) tone when you set the power standby switch to ON. If you do not hear the tone, do not use the device.

1. Connect the power cord directly into the rated wall power outlet or UPS or Shuttle. Make sure it is not connected to a power strip or other equipment outlet.
2. Set the mains power switch behind the control panel to ON.
3. Set the power standby switch on the left side of the control panel to ON.
Make sure that the items that follow occur:
 - The type of model shown on the screen is the same as the type of device (Panda or Giraffe, bedded or nonbedded).
 - All the displays and indicators come on.
 - The POST (Power On Self Test) pass tone operates.
4. Push **Admit Baby** to start operation in Manual Mode.
5. Use the up or down keys to select a Heater Power percentage and stop the prompt tone.
6. Connect the skin temperature probe to the skin temperature probe jack on the right side of the bed.
If you use a device with an in-bed scale, the skin temperature probe jack is above the scale cable jack.
7. Make sure that the skin temperature probe operates correctly.
 - a. Put the skin temperature probe between your fingers.
 - b. Make sure that the Baby Temp value increases.
8. Make sure that the visual alarms and audio alarms activate in Baby Mode.
 - a. Push **Mode** to change to Baby Mode.
 - b. Disconnect the skin temperature probe from the skin temperature probe jack.

- c. Make sure that the items that follow occur:
 - The control panel screen shows the alarm condition.
 - The indicator light at the top of the control panel comes on.
 - The audio alarm activates.
 - d. Use the **Alarm Silence** key or the Hands Free Alarm Silence feature (if enabled) to silence the audio alarm.
9. Push **Mode** to change to Manual Mode.
 10. Use the up or down keys to select a Heater Power percentage and stop the prompt tone.
 11. If the device has an elevating base, use the height adjustment pedals on each side of the device to lift and lower the bed along its full travel range. Make sure that the height adjustment mechanism moves smoothly.
 12. Make sure that the observation lights and procedure light (if equipped) operate correctly.
 13. Do a check of the power failure alarm and the battery-backed-up memory.
 - a. Record the selected control mode and temperature settings, and wait 1 minute.
 - b. Disconnect the power cord from the power outlet.
 - c. Make sure that an alarm operates and the power failure indicator comes on.
 - d. Wait 1 to 2 minutes and then connect the power cord to the power outlet again.
 - e. Make sure that the alarm stops and that the device goes back to the same control mode and temperature settings as before the power failure.

NOTE

A fully charged battery must supply the power failure alarm for 10 minutes minimum (IEC 60601-2-21 clause 201.11.8). If you test the alarm for the full 10 minutes, you must operate the device for a minimum of 2 hours to charge the battery before it is used with a patient. The total charge time is 10 hours. The battery charges only when the device is powered on.

3.2.3 Equipment checks for optional features

Each warmer can possibly have different options and accessories. See [7.12 Options on page 205](#) and [7.12.1 Accessories on page 205](#).

WARNING

PERSONNEL OR PATIENT INJURY HAZARD

Make sure that all optional equipment is securely attached to shelves or rails.

1. Verify that all optional equipment is securely mounted.

Figure 3-32 Shelf



2. Verify the operation of all optional equipment with their applicable user manuals.

3.2.4 Electrical safety tests

Use an approved electrical safety analyzer to do a test of the ground continuity and leakage current of the device.

You must do the tests without the UPS connected to the device. If the UPS is connected to the device, disconnect the UPS and then do the tests.

For reliable leakage current indications, first do the ground resistance check.

Obey the operating instructions supplied by the manufacturer of the electrical safety analyzer to verify the following:

3.2.4.1 Ground resistance check

1. Measure the resistance between the ground pin on the line cord plug and the exposed metal of the electronic enclosure.

The ground resistance must be less than 0.2 Ohms.

2. Measure the resistance between the ground pin on the line cord plug and the ground pin on the appliance outlet connectors.

The ground resistance must be less than 0.1 Ohms.

NOTE

Not all metal components are safety ground bonded. Only the heater reflector, heater duct, power supply mounting bracket(s), electrical enclosure, and elevating base are required to be safety ground bonded. When the ground bonds of these components are disturbed during the servicing, you must verify the ground integrity.

3.2.4.2 Earth leakage and chassis leakage current

Wait 30 seconds after you power on the device before you take measurements.

For 115 VAC rated devices:

1. In normal condition and in all possible operation modes, the leakage current will be 180 microamperes or less.
2. If required by local ordinances, in single fault condition and in all possible operation modes, the leakage current will be 200 microamperes or less.

For 220-230-240 VAC rated devices:

1. In normal condition and in all possible operation modes, the leakage current will be 360 microamperes or less.
2. If required by local ordinances, in single fault condition and in all possible operation modes, the leakage current will be 500 microamperes or less.

3.2.4.3 SpO2 patient lead leakage current

Wait 30 seconds after you power on the device before you take measurements.

The leakage current of the patient lead will be measured between all the leads of the SpO2 connector shorted together and ground. For the service tool part number, refer to [10.2 Service tools on page 313](#).

For AC lead leakage current:

1. In normal condition and in all possible operation modes, the leakage current of the patient lead will be 100 microamperes or less.
2. If required by local ordinances, in single fault condition and in all possible operation modes, the leakage current of the patient lead will be 500 microamperes or less.

For DC lead leakage current:

1. In normal condition and in all possible operation modes, the leakage current of the patient lead will be 10 microamperes or less.
2. If required by local ordinances, in single fault conditions and in all possible operation modes, the leakage current of the patient lead will be 50 microamperes or less.

NOTE

The isolation of the skin temperature probe is dependent on the insulation of the skin temperature probe. The skin temperature probes are 100% tested and it is not necessary to test the skin temperature probes again.

You can wind foil around the skin temperature probe or put 6 inches (15 cm) of the part of the probe that attaches to the patient in normal saline to test the skin temperature probe. Measurements will be taken from the conducting medium.

The leakage current limits of the patient lead that are shown above are applicable.

3.2.4.4 ResusView™ Heart Rate option patient current leakage test (Panda iRes Warmers)

Wait 30 seconds after you power on the device before you take measurements.

Patient-to-Ground (patient source) and Patient-to-Line (patient sink) leakage current checks

1. Connect an HR test body (HR cable with all its leads shorted together) to the HR input of the Panda iRes Warmer.
2. Connect the Panda iRes Warmer power cord to the safety analyzer.
3. Connect the safety analyzer power cord to the power outlet.
4. Attach the safety analyzer test lead to the test body (shorted HR leads).
5. Turn on the safety analyzer, and configure it to measure the patient (source/sink) leakage currents.
6. Turn on the Panda iRes Warmer and enable the HR.

Acceptance criteria for Patient-to-Ground (patient source)

In normal conditions and in all possible operating modes, the patient leakage current will be 10 μ A or less.

In single fault conditions, the patient leakage current will be 50 μ A or less.

Acceptance criteria for Patient-to-Line (patient sink)

In normal conditions and in all possible operating modes, the patient leakage current will be 10 μ A or less.

3.2.5 Scale checkout procedures

3.2.5.1 Scale hardware check

1. Confirm that all 4 shipping screws are removed from all corresponding screw holes.
2. Confirm that scale cable is routed through the north wall, not around the north wall. Also make sure that the scale cable is not heavily bent or pinched.
3. Confirm that blankets, covers, and cushions are tucked between the mattress and scale tray, not over the side of the scale.

3.2.5.2 Visual inspection

1. Examine the scale parts for signs of damage. Replace all damaged parts.
2. Make sure that the scale connector is tightly assembled. Look for bent pins.
3. Make sure that there is no mechanical interference between the scale cable and the device.
4. Make sure that the scale cable is not across a corner tray of the bed. Move the corner tray if it is necessary.

Figure 3-33 Cable not across a tray (correct)



Figure 3-34 Cable across a tray (incorrect)

5. Make sure there are no items below the transparent plexiglass plate or scale platform.

3.2.5.3 Center weight check

Tools required

5 kg weight

Time required

10 minutes

1. Set the power standby switch on the left side of the control panel to OFF.
2. Remove all objects from the bed and make sure that only the mattress and transparent plate stays on the scale.
3. Make sure that the bed is level.
4. To go to service mode, set the power standby switch on the left side of the control panel to ON. Immediately push **Help** and **Alarm Silence** until you hear 2 tones (about 5 seconds).
5. Press **Scale Calibration**.
6. Record the SC value on the screen and name it SC1.
The SC1 value must be between 9900 and 11000.
7. Put a 5 kg weight on the center of the scale on the bed.
See location 1 in [Figure 3-35 Weight placement locations on page 97](#).
8. Record the SC value on the screen and name it SC2.
9. Subtract SC1 from SC2.
The value must be 5000 ± 10 .

3.2.5.4 Off center weight check

Tools required

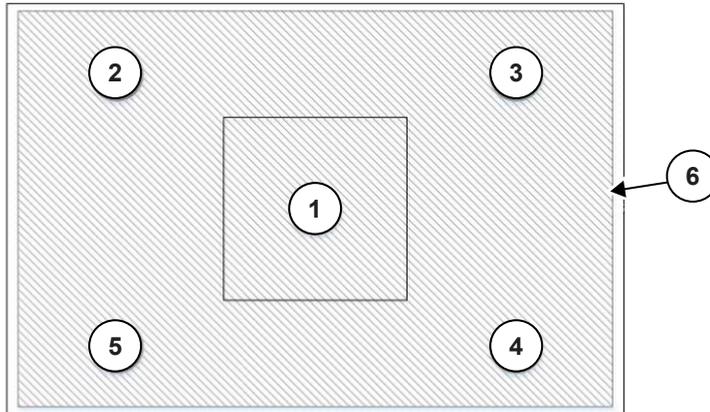
5 kg weight

Time required

15 minutes

1. Set the power standby switch on the left side of the control panel to OFF.

2. Remove all objects from the bed and make sure that only the mattress and transparent plate stays on the scale.
3. Make sure that the bed is level.
4. To go to service mode, set the power standby switch on the left side of the control panel to ON. Immediately push **Help** and **Alarm Silence** until you hear 2 tones (about 5 seconds).
5. Push **Scale Calibration**.
6. Record the SC value on the screen and name it SC3.
The SC3 value must be between 9900 and 11000.
7. Put a 5 kg weight on 1 corner of the scale on the bed.
See location 2 in [Figure 3-35 Weight placement locations on page 97](#).
8. Record the SC value on the screen and name it SC4.
9. Subtract SC3 from SC4.
The value must be 5000 ± 10 .
10. Put a 5 kg weight on the second corner of the scale on the bed.
See location 3 in [Figure 3-35 Weight placement locations on page 97](#).
11. Record the SC value on the screen and name it SC5.
12. Subtract SC3 from SC5.
The value must be 5000 ± 10 .
13. Put a 5 kg weight on the third corner of the scale on the bed.
See location 4 in [Figure 3-35 Weight placement locations on page 97](#).
14. Record the SC value on the screen and name it SC6.
15. Subtract SC3 from SC6.
The value must be 5000 ± 10 .
16. Put a 5 kg weight on the fourth corner of the scale on the bed.
See location 5 in [Figure 3-35 Weight placement locations on page 97](#).
17. Record the SC value on the screen and name it SC7.
18. Subtract SC3 from SC7.
The value must be 5000 ± 10 .

Figure 3-35 Weight placement locations

1	Center
2	First corner
3	Second corner
4	Third corner
5	Fourth corner
6	Transparent plate

3.2.5.5 Load cell check

Tools required

- Phillip's head screwdriver
- 5.5 mm nut driver

Time required

15 minutes

Parts required

In Bed Scale Load Cell Kit (Needed for replacement of load cell. Refer to the scale manual for the part number.)

1. Do the [4.1 Scale calibration \(bedded only\)](#) on page 117.
2. Set the power standby switch on the left side of the control panel to OFF.
3. Make sure that no mechanical interference (loose screws, etc.) exists and that the routing of the scale cable is correct.
4. To go to service mode, set the power standby switch on the left side of the control panel to ON. Immediately push **Help** and **Alarm Silence** until you hear 2 tones (about 5 seconds).
5. Press **Scale Calibration**.
6. Examine the displayed SC value and confirm that the value does not change more than 5 counts total.
7. If the SC value changes more than 5 counts, 1 or the 2 load cells can possibly be defective. Do the steps that follow:

- a. Remove the scale top tray and the control board cover to get access to the load cell connectors on the control board.
- b. Disconnect 1 load cell from the control board at a time and examine the SC value. If the SC value changes 5 counts or fewer after you disconnect the load cell, the disconnected load cell is defective and you must replace the load cell.

3.2.6 ResusView™ Heart Rate option checkout procedures (Panda iRes Warmers)

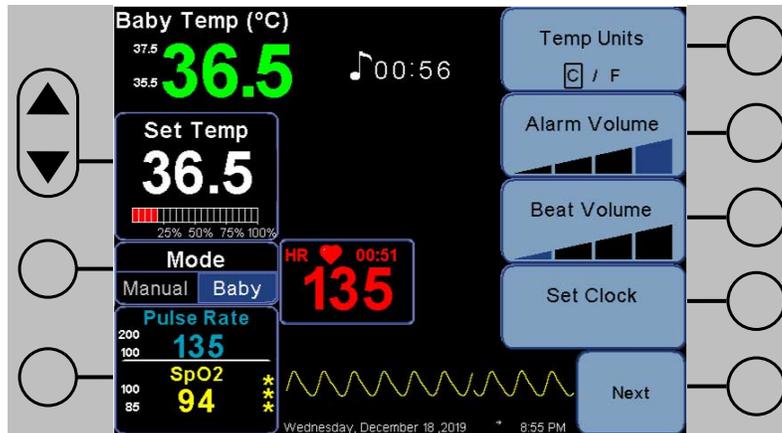
3.2.6.1 HR test

1. Toggle the Panda Warmer power standby switch to the on position.
2. Push **Admit Baby**.
3. Push the temperature/power decrease key to reduce the heater power to 20%.
4. Push **HR On/Off**.
The device displays HR Lead Off.
5. Connect the HR patient cable to the green HR connector located on the side of the probe panel.
6. The HR option has 3 leads that connect to the ECG patient simulator:
 - a. Connect the LL lead.
 - b. Connect the RA lead.
 - c. Connect the LA lead.
7. Power on the ECG patient simulator and set the wave form to Pediatric Normal Sinus Rhythm (NSR) Wave.
8. Set the ECG patient simulator to 100 bpm and 0.75 mV and test for 10 seconds.
9. Verify the Panda LCD and the ECG patient simulator show the same heart rate and waveform.
10. Set the ECG patient simulator to 200 bpm and 0.75 mV and test for 10 seconds.
11. Verify the Panda LCD and the ECG patient simulator show the same heart rate and waveform.

3.2.6.2 HR volume check

1. Push **Menu > Setup**.
2. Push **Beat Volume** repeatedly to increase the volume and to mute the heart rate sound.
The HR volume check test passes if the volume increased and was muted.

Figure 3-36 HR beat volume



3. Push **Next** > **Exit** to return to the main display.

If the HR volume check fails, refer to [5.1.7.4 Alarm Diagnostics](#) on page 125.

3.2.7 Resuscitation system setup and checkout procedures

A new system does not need to be cleaned for oxygen service before use.

Before each operation, inspect the resuscitation system for damage, such as broken knobs and fittings or gauges with indicator needles that are not at 0.

3.2.7.1 Resuscitation system gas supply connection

WARNING



FIRE OR EXPLOSION HAZARD

Do not use oil, grease or other flammable material on the valve, yoke, or cylinder. Oxygen in the system can cause these materials to burn or explode. Only use approved lubricants that are not flammable.

Make sure you wear clean and dry gloves when you touch connection gaskets. If gloves are not available, make sure you carefully clean and fully dry your hands before you touch a gasket. Do not apply lotions or alcohol-based cleaners to your hands.

The hose color and fitting style for the air and oxygen gas inputs may be different for each country and region.

Make sure that the hoses that connect the low pressure gas source to the device meet the gas supply characteristics in [11.10 T-piece resuscitation specifications](#) on page 321 and [11.11 Bag and Mask resuscitation specifications](#) on page 322.

3.2.7.1.1 Installing the air and oxygen tanks (blender option only)

WARNING



PATIENT INJURY HAZARD

Use only 1 gasket to make the sealing connection. Never use multiple gaskets in any sealing application.

1. Remove the tanks from the manufacturer packaging.

- For a sealed gas path connection, make sure that a sealing gasket is correctly installed between the outlet of the cylinder valve and the yoke. The sealing gasket, also known as a sealing washer, is a critical component of the oxygen supply system.

Make sure that the sealing gasket fits in the seating surface area of the connection. Make sure that the sealing gasket does not have an overlap with the connection or directly touch the flow of oxygen. Use only 1 sealing gasket to make the sealed gas path connection.

Figure 3-37 Sealing gasket



There are 2 basic categories of sealing gaskets:

- Disposable crush-style sealing gaskets are usually made of nylon or a different polymer.

Figure 3-38 Disposable sealing gasket



- Reusable elastomeric sealing gaskets are usually made of an elastomeric compound that is supported by a metal ring.

Figure 3-39 Reusable sealing gasket



- Before you use a sealing gasket on a valve or regulator connection, inspect the sealing gasket.

Do not use sealing gaskets if any of the items that follow occur:

- The sealing gasket is permanently damaged.
- The sealing gasket has splits, cracks, chips, frays, deformations, or gouges.
- The sealing gasket has dirt, oil, grease, or other contamination that can cause an oxygen ignition.
- The sealing gasket has a condition that can cause a leak or incorrect seal in the connection.

- Put the tank in the tank holder.

Figure 3-40 Tank holder



- Lift the tank and install the tank in the yoke behind the resuscitation system. Make sure that the 2 holes on the tank align with the 2 pins on the yoke.

Figure 3-41 Pins on yoke



Figure 3-42 Holes on tank



Figure 3-43 Tank yoke connection

The tank holders on the device can only hold E-type and C-type cylinders based on the configuration. For all other cylinder types, 3 accessory options (GE part 6600-0836-800, M1151570, M1151571) are available. You can mount the tank accessory options on the dovetail rail.

6. Tighten the yoke handle clockwise by hand. Do not use a tool or device to tighten the yoke handle.

Figure 3-44 Yoke handle

7. Use the tank wrench to slowly turn the valve counterclockwise.

Figure 3-45 Valve

8. Examine the gauge on the front panel of the resuscitation system (refer to [Figure 1-3 Warmer, front oblique view on page 22](#)) to verify that the tank contains a sufficient supply of gas.

9. Listen for hissing or leaking sounds that can identify an incorrect seal. If you hear sounds, close the valve immediately by turning clockwise and inspect all equipment again. If a correct seal is not obtained, do not use the equipment.
10. Do the procedure again for the second tank.

3.2.7.1.2 Removing the tank (blender option only)

WARNING



PATIENT INJURY HAZARD

Close the tank valve before you disconnect the tank from the regulator.

1. Use the tank wrench to turn the tank valve clockwise until the valve fully closes.

Figure 3-46 Valve



2. Hold the tank and turn the yoke handle counterclockwise to loosen the tank from the yoke.

Figure 3-47 Yoke handle



- Lift the tank and uninstall the tank from the yoke behind the resuscitation system.

Figure 3-48 Tank yoke connection



- Remove the tank from the tank holder.

Figure 3-49 Tank holder



- If a disposable crush-style sealing gasket was used to connect the tank to the yoke, remove the gasket.

3.2.7.1.3 Low pressure gas connection

CAUTION



PATIENT INJURY HAZARD

Close the 2 tank valves when you use the wall gas connection so gas does not drain from the tanks.

NOTE

Make sure that the pressure of the low-pressure gas supply to the device has been verified by the facility. The recommendation of GE Healthcare is to set the air and oxygen supplies to the same pressure within the specified range for gas supply characteristics. See [11.10 T-piece resuscitation specifications on page 321](#) and [11.11 Bag and Mask resuscitation specifications on page 322](#).

1. Connect the low-pressure gas source hoses to the inlets behind the resuscitation system.

Figure 3-50 Low-pressure gas connection inlets



2. Set the medical gas switch to ON. The medical gas switch is on the front panel.

3.2.7.2 Suction checkout

CAUTION



PATIENT INJURY HAZARD

Do not keep the suction switch ON when the system is not in use. This can drain the gas from the tanks.

NOTICE

The suction component does not include an overflow protection device. You must include overflow protection to prevent damage to the resuscitation equipment, such as a suction canister with hydrophobic filter and an overflow safety trap. If an overflow occurs, do not use the resuscitation system and do clean and repair the suction generator if necessary.

The venturi suction system uses the oxygen supply only.

1. Verify that a clean suction canister is correctly installed in the suction canister holder.

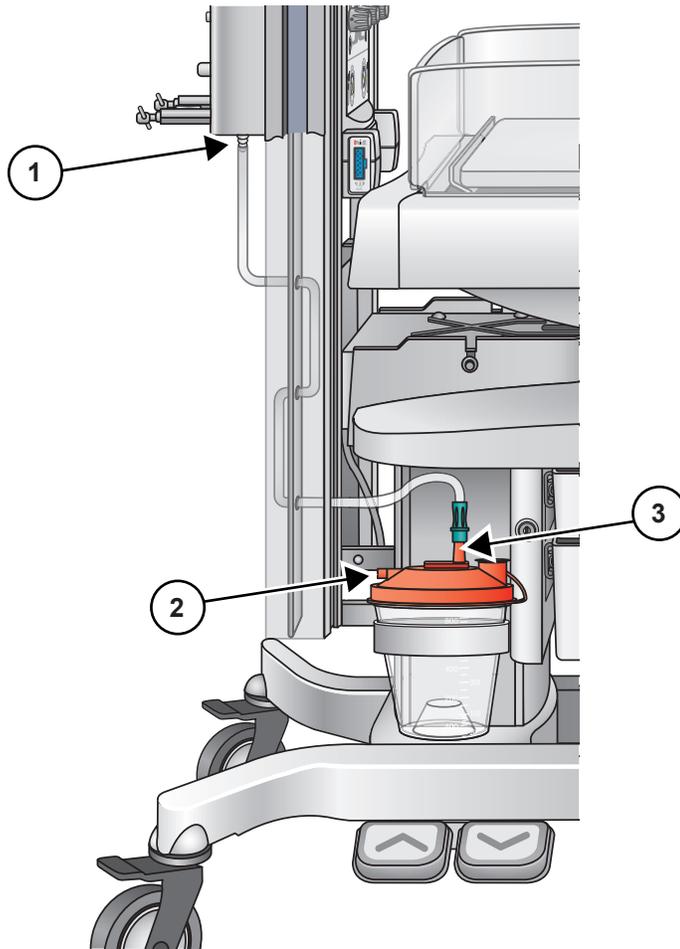
Figure 3-51 Suction canister



The disposable suction canister supplied with the resuscitation system includes a hydrophobic filter.

2. Attach tubing from the suction port located at the bottom of the resuscitation unit to the vacuum inlet port on the suction canister.

Figure 3-52 Suction ports



1	Suction port at bottom of resuscitation unit
2	Patient port
3	Vacuum port

3. Attach the necessary length of suction tubing to the patient port on the suction canister.

Figure 3-53 Suction tubing connection to patient port



4. Set the suction switch to ON.

Figure 3-54 Suction switch on



5. Clamp the suction tubing to occlude it. First, make sure that you can achieve the full range of desired suction that can be necessary. Then adjust the suction control knob to the necessary pressure between 60 and 120 mm Hg.

Figure 3-55 Suction control knob



6. Connect a patient suction catheter (not available from GE) to the suction tubing.

Figure 3-56 Patient suction catheter



7. Set the suction switch to OFF until you are prepared to start resuscitation or airway support.

Figure 3-57 Suction switch off



If the suction canister overflows during operation, set the suction switch to OFF and replace the suction tubing and suction canister.

Refer to the OEM instructions of the suction canister for operation instructions.

3.2.7.3 T-piece resuscitation system oxygen delivery checkout

WARNING



PATIENT INJURY HAZARD

Do not use a disposable T-piece circuit on more than 1 patient. The disposable T-piece circuit cannot be cleaned and used again. This can cause damage to the circuit or expose the patient to risk of infection.

WARNING



PATIENT INJURY HAZARD

Only use GE Healthcare approved T-piece options with the resuscitation system.

WARNING



PATIENT INJURY HAZARD

The T-piece gas outlet is not intended for use with self-inflating or flow-control manual resuscitators (traditional bag and mask resuscitators).

WARNING



PATIENT INJURY HAZARD

Before you use the resuscitation system, you must set the flow, PIP, and PEEP parameters to verify circuit integrity.

WARNING



PATIENT INJURY HAZARD

Make sure the T-piece circuit is clean and there is no obstruction before you use it.

WARNING**PATIENT INJURY HAZARD**

You must use an airway pressure manometer when you use positive end expiratory pressure (PEEP) or positive inspiratory pressure (PIP).

1. Attach the oxygen tubing for free-flow oxygen to the left gas outlet on the front panel of the resuscitation system.

Figure 3-58 Oxygen tubing connection



2. Connect the T-piece circuit to the T-piece gas outlet on the front panel.

Figure 3-59 T-piece circuit



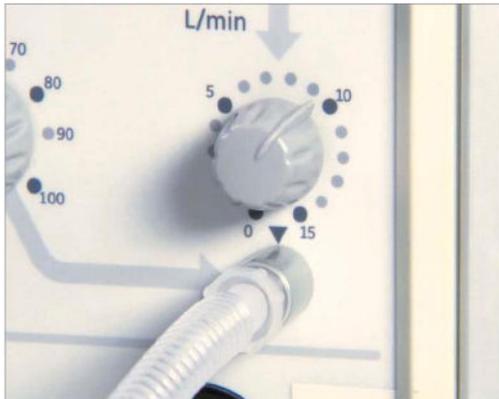
3. Set the medical gas switch to ON if it is not.

Figure 3-60 Medical gas switch ON



4. Turn the flowmeter control knob above the gas outlet to the necessary flow rate between 5 and 15 L/min.

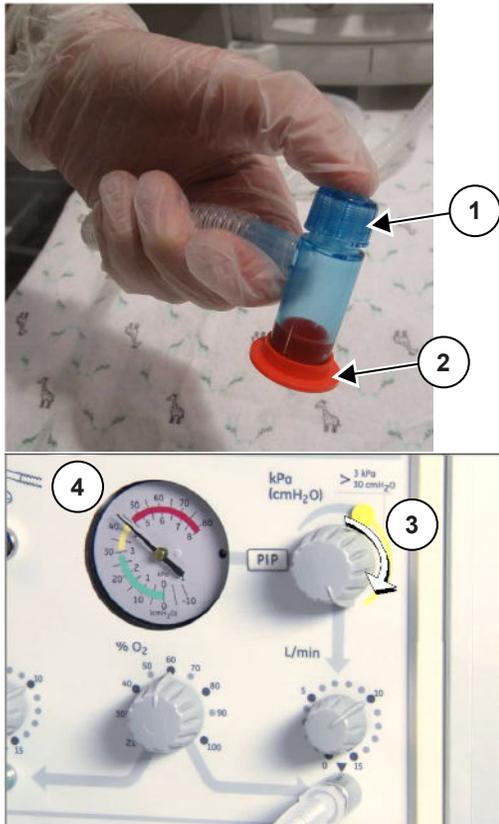
Figure 3-61 Flowmeter control knob



5. To verify the maximum inspiratory pressure:
 - a. Make sure that the end cap is attached to the T-piece circuit.
 - b. Put a finger on the PEEP control knob on the T-piece circuit.
 - c. Turn the PIP control knob on the front panel fully clockwise, beyond the PIP override release.

- d. Verify that the airway pressure manometer can obtain 45 cm H₂O ± 5 cm H₂O (4.5 kPa ± 0.5 kPa).

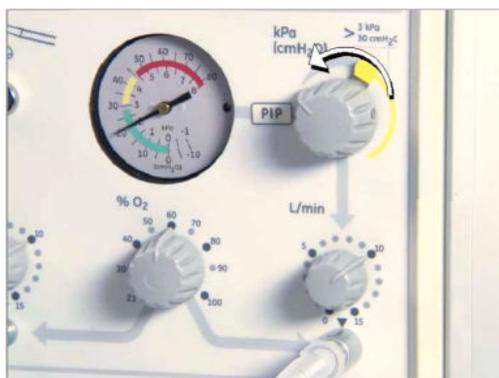
Figure 3-62 Verification of maximum inspiratory pressure



1	PEEP control knob
2	End cap
3	PIP control knob
4	Airway pressure manometer

- 6. Keep your index finger on the PEEP control knob and turn the PIP control knob counterclockwise to the necessary PIP.

Figure 3-63 PIP control knob



- Remove your index finger from the PEEP control knob and turn the PEEP control knob to the necessary pressure between 0 and 5 cm H₂O.

Figure 3-64 PEEP control knob



- For devices with a blender, adjust the blender control knob to the necessary FiO₂ between 21 and 100%.

Figure 3-65 Blender control knob



WARNING



PATIENT INJURY HAZARD

Oxygen concentration should be verified with an independent oxygen analyzer per hospital practices.

- Set the medical gas switch to OFF until you are prepared to start resuscitation or airway support.

Figure 3-66 Medical gas switch OFF



3.2.7.4 Bag and Mask resuscitation system oxygen delivery checkout

WARNING



PATIENT INJURY HAZARD

Oxygen concentration should be verified with an independent oxygen analyzer per hospital practices.

1. Attach the oxygen tubing for free-flow oxygen to the left gas outlet on the front panel of the resuscitation system.

Figure 3-67 Oxygen tubing connection



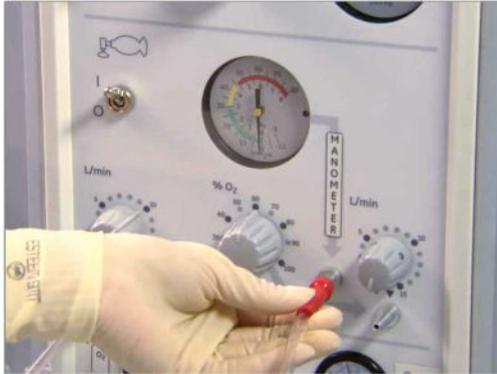
2. Use the oxygen tubing to connect a self-inflating or flow-inflating manual resuscitator to the right gas outlet.

Figure 3-68 Manual resuscitator



3. Connect the pressure tubing from the manual resuscitator to the pressure manometer connector on the front panel of the resuscitation system. See [Figure 3-69 Pressure manometer on page 114](#). Skip this step if you use a manual resuscitator with an integrated manometer.

Figure 3-69 Pressure manometer



4. Set the medical gas switch to ON if it is not.

Figure 3-70 Medical gas switch on



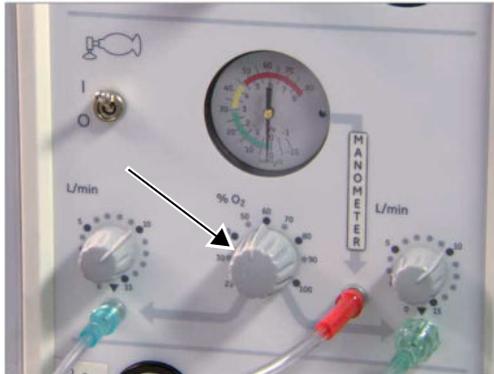
5. Turn the flowmeter control knob above the right gas outlet to the necessary flow rate between 5 and 15 L/min.
6. Occlude the patient connection port or face mask of the manual resuscitator and confirm the PEEP and PIP on the manual resuscitator according to unit protocol.

Figure 3-71 Patient connection port



- For devices with a blender, adjust the blender control knob to the necessary FiO_2 between 21 and 100%.

Figure 3-72 Blender control knob



- Set the medical gas switch to OFF until you are prepared to start resuscitation or airway support.

Figure 3-73 Medical gas switch off



3.2.8 Nurse Call

The computer or RS-232 monitor’s user program must continuously check the data link. The program should constantly verify connection to the warmer controller and check for updated data.

After you connect the nurse call cable, test the system to make sure a disconnected cable causes an alarm. A disconnected cable does not cause an alarm if the system uses a normally open connection.

3.2.8.1 Contact ratings

- Maximum resistive load: 4 VA
- Maximum DC switching voltage: 100 VDC
- Maximum switching current: 0.25 A
- Maximum carrying current: 0.50 A

3.2.8.2 Connector

The Nurse Call contacts and the serial data output share the same female, 9 pin, d-type connector.

Table 3-2

	Description
Pin 6	Closed contact under normal conditions, that is, power on, no alarm (recommended configuration).

Table 3-2 (Table continued)

	Description
Pin 1	Common contact
Pin 9	Open contact under normal conditions, power on, no alarm. These contacts are not powered. They only provide closure.

3.2.8.3 Nurse Call signals

Table 3-3 Nurse Call signals

Warmer status	Nurse Call signal	
	Pins 1 and 6	Pins 1 and 9
Normal	Closed	Open
Alarm	Open	Closed
Power switch off or power fails	Open	Closed
Nurse Call cable disconnected	Open	Open

3.2.8.4 Nurse call checkout

1. Complete the procedure in [3.2.2 Controller checks on page 89](#).
2. Verify that the nurse call station operates correctly. Refer to the instructions from the manufacturer.
3. Connect the nurse call connector to the device. Refer to the instructions from the manufacturer for the cable connection.
4. Put the device in Baby Mode.
5. Disconnect the skin temperature probe to activate an alarm.
6. Verify that you also get an alarm at the nurse call station.

Chapter 4 Calibration

4.1 Scale calibration (bedded only)

Tools required

5 kg Certified Test Weight (GE part number 6600-0209-800)

Time required

15 minutes

For EU Member States, this scale is made to follow the non-automatic weighing instruments (NAWI) directive, 2009/23/EC. To verify compliance to the Directive, calibrate the device with an accredited local test authority. If you cannot identify a test authority, speak to your GE representative or distributor for help.

Make sure to verify (calibrate) the scale to agree with the specifications of National Regulations Governing Legal Metrology at their specified intervals. The calibration frequency can be different for each country. Speak to your local weights and measures authority for information.

NOTE

While you calibrate EU scales, use the latest revision of the MIRS report for the software version.

1. Set the power standby switch on the left side of the control panel to OFF.
2. Make sure that the bed is level.

You can look at the bubble level on the side bedside panels to make sure the bed is level.

3. To go to service mode, set the power standby switch on the left side of the control panel to ON. Immediately push **Help** and **Alarm Silence** until you hear 2 tones (about 5 seconds).
4. On the *Main Menu*, select **Scale Calibration > Manual Calibration**.
5. Use the up and down arrows to set the gram value of the test weight and push **Enter**.
6. Remove objects from the bed and make sure only the mattress and clear plate stay on the scale.
7. Push **Enter** to start the calibration.

The system displays `Scale Obtaining Tare`.

8. When the screen displays `Apply Test weight`, put the weight on the center of the bed and push **OK**.

If calibration is successful, the screen displays `Calibration Successful`. If calibration is not successful, push **Recal** and do steps 1 through 9 again.

9. Do 1 of the following:
 - Push **Save** to save the new calibration values.
 - Push **Abort** to keep the initial values.
10. Set the power standby switch to OFF to exit service mode.

11. Set the power standby switch to ON to go to operation mode.
12. To verify the precision of the scale, do the weighing procedure and use the test weight. Make sure that the measured value for the test weight is $\pm 10\text{g}$.
13. Do the [3.2.5 Scale checkout procedures on page 94](#).

Chapter 5 Software

5.1 Service mode

To access the main service menu, turn on the device and hold **Help** and **Alarm Silence** until you hear 2 tones (approximately 5 seconds) and release. See [Figure 1-6 Control panel and control panel screen on page 27](#). To exit service mode, it is necessary to power down the device.

If the device will not boot up, the service mode can be accessed by setting control board dip switch position 1 to ON and turning on mains power. The default position of all 8 dip switch positions is OFF.

For versions of application software 1.0.9 and earlier, refer to [6.3 Troubleshooting application software 1.0.9 and earlier on page 162](#) for instructions about accessing and using service software.

5.1.1 Unit information

From the service mode main menu, push **Help** to access the *Unit Information* screen.

When finished, push **Help** again to return to the previous menu.

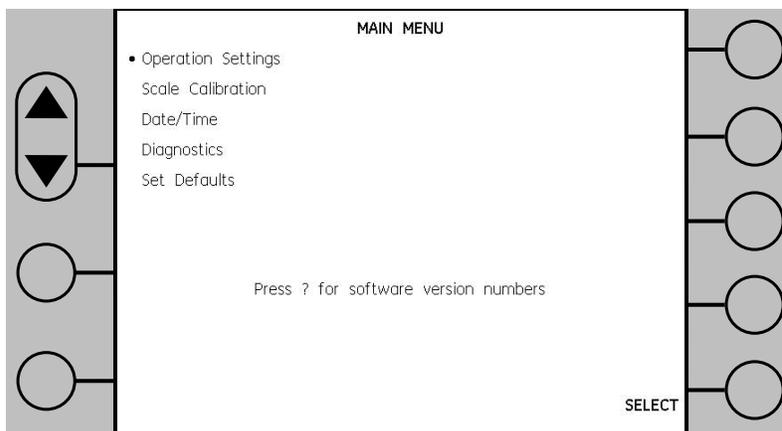
5.1.2 Main menu

The service mode main menu provides the following functions:

- Operation Settings
- Scale Calibration
- Date/Time
- Diagnostics
- Set Defaults

Use the up and down arrow keys to highlight menu choices and push **Select** to display the desired menu.

Figure 5-1 Main Menu

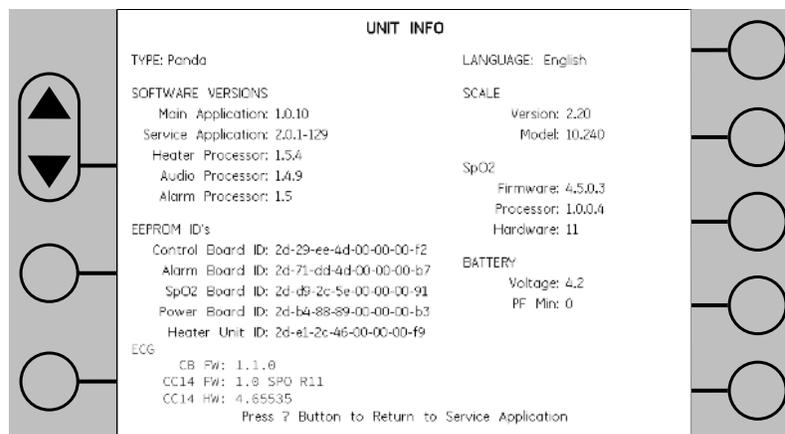


5.1.3 Unit Info menu

The *Unit Info* menu displays the following information:

- Type Giraffe or Panda (factory configured)
- Version of main application and service application
- Version of heater control, audio, and alarm board processors
- Version of scale, SpO2, and ECG (if present)
- EEPROM ID's for control, power, alarm, and SpO2 board (if present)
- Language
- Power Fail (PF) minutes and battery voltage

Figure 5-2 Unit Info



Absence of data in the SpO2 and HR areas of the screen is normal when the device does not have the SpO2 or ResusView™ Heart Rate (HR) option. Otherwise, absence of data indicates a communication failure.

5.1.4 Operation Settings

The *Operation Settings* menu enables users to customize the behavior of alarms, user functions, and displayed units by setting default values for the parameters and options listed in the table that follows.

Table 5-1 Operation settings

Feature	Available settings	US default	International default
Patient temp. alarm	0.5°C / 1.0°C	1.0°C	1.0°C
Check patient alarm disabled	5% - 50%	25%	25%
Man. temp. alarm	Off / 0.5°C / 1.0°C	Off	Off
Alarm volume	1 / 2 / 3 / 4	4	4
Hands free silence	Enable / Disable / Dis-engaged	Enable	Enable
Bed elevate (for bedded warmers with elevating base)	Enable / Disable / Dis-engaged	Enable	Enable

Table 5-1 Operation settings (Table continued)

Feature	Available settings	US default	International default
Bed elevate (for bedded warmers with fixed-adjustable base, freestanding warmers, and wall mount warmers)	Enable / Disable / Disengaged	Disengaged	Disengaged
Temp. units	°C / °C Only / °F	°C	°C Only
Scale units	grams / lbs-oz / grams only	grams	grams only
Scale resolution	10 grams / 5 grams	10 grams	10 grams
Language	Many	English	English
Low pulse rate limit* ¹	25 - 110	100	100
High pulse rate limit* ¹	111 - 240	200	200
Low saturation limit* ²	20 - 99	85	85
High saturation limit* ²	86 - 100	100	100
SpO2 alarm suspension on startup* ³	0 / 15 / 30	15	15
SpO2 averaging (Masimo only)	2-4 / 8 / 16	8	8
SpO2 sensitivity (Masimo only)	Normal / Maximum	Normal	Normal
SpO2 SatSeconds (Nellcor only)	Off / 10 / 25 / 50 / 100	Off	Off
SpO2 Response Mode (Nellcor only)	Normal / Fast	Normal	Normal
SpO2 Display (Nellcor only)	Pleth / Blip	Pleth	Pleth
SpO2 View	Large / Normal	Large	Large
Pulse/Beat Tone Vol.	0 / 1 / 2 / 3 / 4	1	1
Time Format	12 hour / 24 hour	12 hour	24 hour
Date Format	YYYY/MM/DD MM/DD/YYYY DD/MM/YYYY	MM/DD/YYYY	DD/MM/YYYY
APGAR TONES (Giraffe Only)* ⁴	ON / OFF	OFF	OFF
HR Waveform Scale (Panda iRes bedded only)	0.2X / 0.5X / 1X / 2X	1X	1X
HR Waveform Speed (Panda iRes bedded only)	12.5 mm/sec / 25 mm/sec	25 mm/sec	25 mm/sec

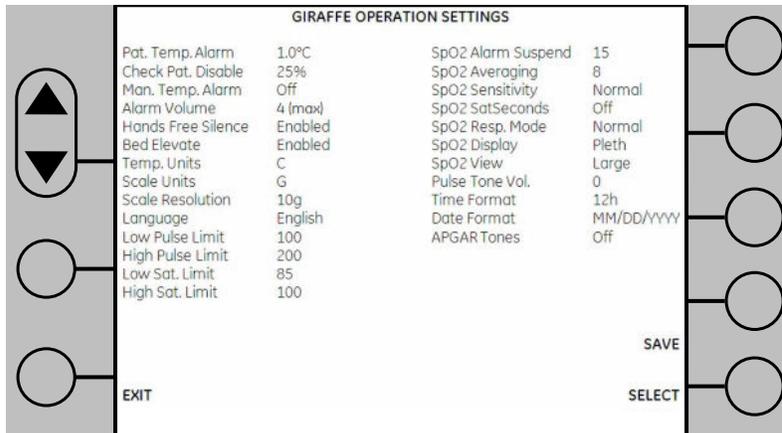
*1 The Low pulse rate limit can be set only between 25 and the High pulse rate limit -1. The High pulse rate limit can be set only between the Low pulse rate limit +1 and 240.

*2 The Low saturation limit can be set only between 20 and the High saturation limit -1. The High saturation limit can be set only between the Low saturation limit +1 and 100.

*3 You must verify the “SpO2 alarm suspension setting on startup” to make sure the time is correct for your site. The default time is 15 seconds.

*4 The APGAR Tones setting turns on or off the tone for the Callback Timer of the Giraffe Warmer.

Figure 5-3 Operation Settings



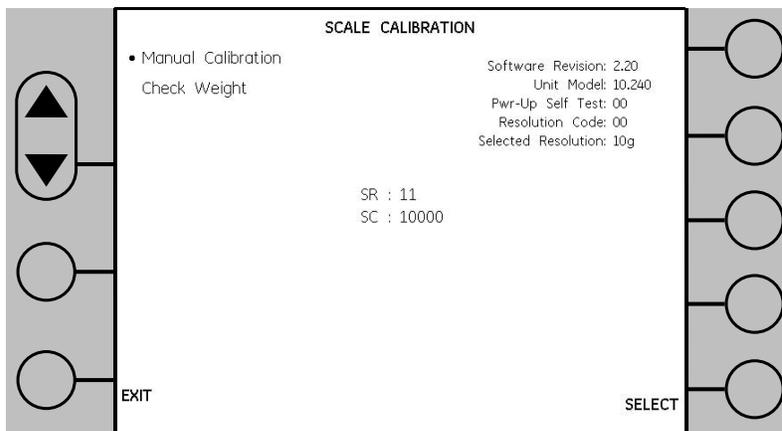
5.1.5 Scale Calibration

The *Scale Calibration* menu displays the Scale Recalibration Count (SR) and Corrected value (SC). It also displays the scale software revision, model, resolution code, and POST (power on self test) results.

Menu selections:

- Manual Calibration (refer to [4.1 Scale calibration \(bedded only\)](#) on page 117 for details).
- Check Weight. Used to verify the correct weight is reported once calibration is complete.

Figure 5-4 Scale Calibration



5.1.6 Date/Time

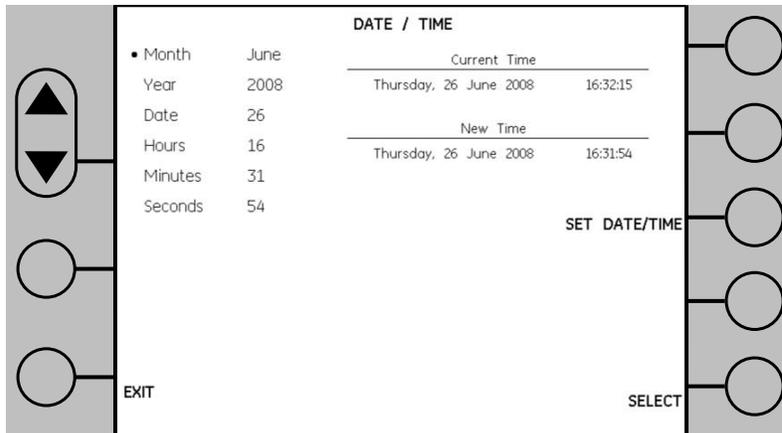
The *Date/Time* menu displays 2 primary data sets, Current Time and New Time.

Current Time displays the current day of the week, day, month, year, hour, minutes, and seconds.

New Time displays the current time until changes are made to the parameters listed on the left of the screen. The user changes the New Time settings by using the up and down arrow keys and **Select**. Once the desired settings are displayed in the New Time section, they may be used to modify the current settings by pushing **Set Date/Time**.

To set only the hour, minute, or second, highlight the hour, minute, or second in the left hand menu and push **Select**. Adjust as needed using the up or down arrow keys. Then push **Hour Only**, **Minutes Only**, or **Seconds Only** as appropriate.

Figure 5-5 Date/Time

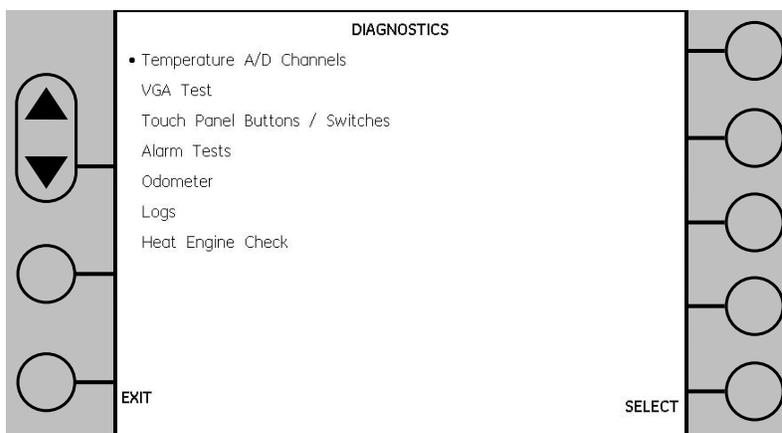


5.1.7 Diagnostics

The *Diagnostics* menu provides the following functions:

- Temperature A/D Channels
- VGA Test
- Touch Panel Buttons / Switches
- Alarm Tests
- Odometer
- Logs
- Heat Engine Check

Figure 5-6 Diagnostics



5.1.7.1 Temperature ADC Diagnostics

The *Temperature ADC Diagnostics* screen displays reference voltages, readings from both patient probe thermistors, 1 fixed thermistor input, and the ambient temperature of the control board.

Table 5-2 Expected values

	ADC Channel	Raw Value	Corrected Value
1	Vthref	2048 (±4)	1500 (±3) mV
2	Vo/t	NA	NA
3	Pat Probe Thermistor 1	NA	Pat Probe Thermistor 2 ±0.3°C
4	Pat Probe Thermistor 2	NA	Pat Probe Thermistor 1 ±0.3°C
5	Vref 37°C	2232 (±23)	37.3 (±0.2)°C
6	Ambient Temp	NA	NA
7	Unused	NA	NA
8	Vref 1P235	1706 (±8)	1250 (±6) mV

Figure 5-7 Temperature ADC Diagnostics

TEMPERATURE ADC DIAGNOSTICS		
ADC Channel	Raw Value	Corrected Value
1) Vthref	2049	1499 mV
2) Vo/t	283	207 mV
3) Pat Probe Therm 1	2352	36.25 °C
4) Pat Probe Therm 2	1989	39.38 °C
5) Vref 37°C	2223	37.36 °C
6) Ambient Temp.	1445	36.98 °C
7) Unused	0	0 mV
8) Vref 1P235	1699	1243 mV

5.1.7.2 VGA Diagnostics

The *VGA Diagnostics* menu provides 1 selectable multi-color test pattern and 6 selectable black and white test patterns.

The color test pattern should not have drop out or incorrectly displayed colors.

The 6 gray-scale test patterns display alternate pixels turned on and off, then off and on, in horizontal, vertical, and diagonal patterns. Failed pixels will appear as dark spots (drop out).

Figure 5-8 VGA Diagnostics

VGA DIAGNOSTICS	
• Multi-Color Test Pattern	
Horizontal 1-0 Test Pattern	
Horizontal 0-1 Test Pattern	
Vertical 1-0 Test Pattern	
Vertical 0-1 Test Pattern	
Diagonal 1-0 Test Pattern	
Diagonal 0-1 Test Pattern	
Use Up/Dwn Buttons to Select Desired Test Pattern Press SELECT to Display Selected Pattern on LCD Press Lower Left Button at any time to Return.	

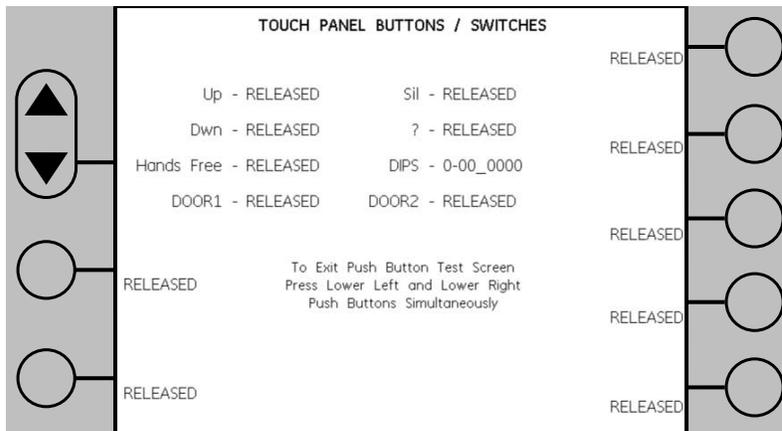
5.1.7.3 Touch Panel Buttons / Switches

The *Touch Panel Buttons/Switches* menu displays the control board dip switch settings and the status of Door 1 and Door 2, which are not used at this time.

This menu allows the user to test the up or down arrow keys, the 7 menu select keys, **Alarm Silence** key, and **Help** key.

It also provides a function to test the response of Hands Free Alarm Silence.

Figure 5-9 Touch Panel Buttons/Switches



NOTE

DIP switch factory settings are all switches off.

5.1.7.4 Alarm Diagnostics

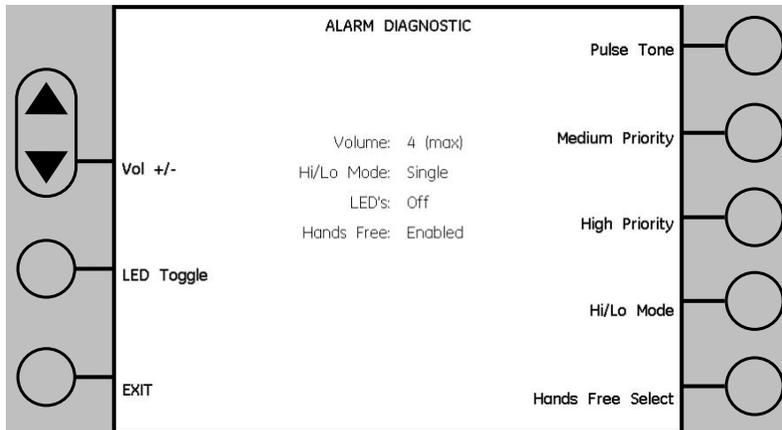
The *Alarm Diagnostic* menu provides the following functions:

- Alarm LED toggle
- Audio tests for pulse tone, alarm priorities, beat tone
- Vol + / -
- Hands free

2 test modes are available: single (1 tone) and continuous.

Hands Free Alarm Silence may be exercised by setting the mode to Continuous and Hands Free to enabled and invoking an alarm.

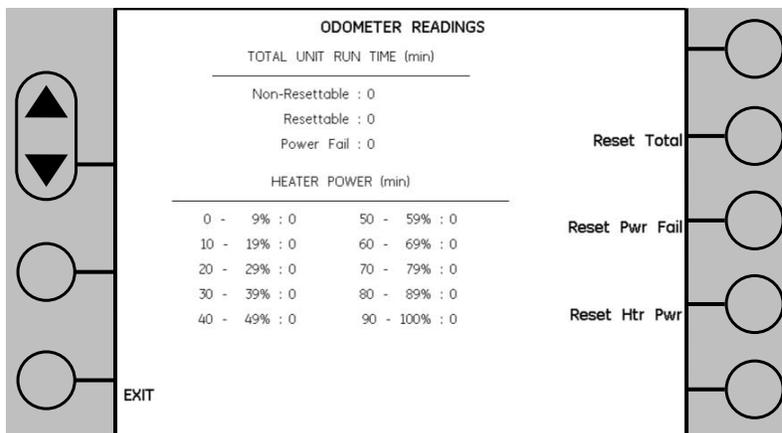
Figure 5-10 Alarm Diagnostic



5.1.7.5 Odometer Readings

The *Odometer Readings* menu displays a resettable and non-resettable hour meter, power fail minutes, as well as run hours versus output from 0 to 100% in 10% increments. The resettable hour meter, power fail counter, and heater power values may all be reset to 0 from this menu.

Figure 5-11 Odometer Readings



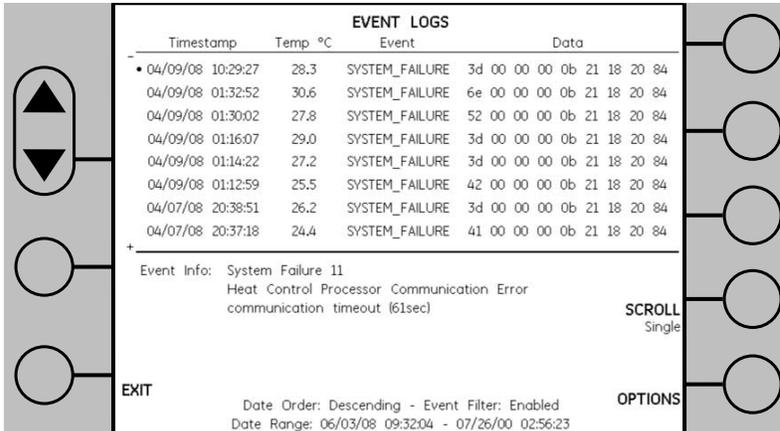
5.1.7.6 Event Logs

The *Event Logs* menu displays system and user events like power up, key presses, system failures, etc. Information displayed includes date and time, ambient (control board) temperature, event name, and raw (hexadecimal) data.

More detail is displayed below the list for a selected event. The user may scroll to any event in the list by using the up or down arrow keys.

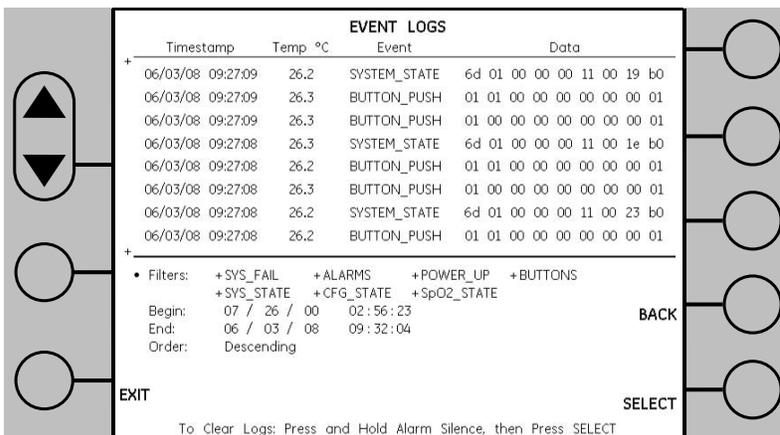
The options sub-menu provides a means to filter on 1 or more event types. The user may also filter by specified dates and times and sort in ascending or descending order.

Figure 5-12 Event Logs



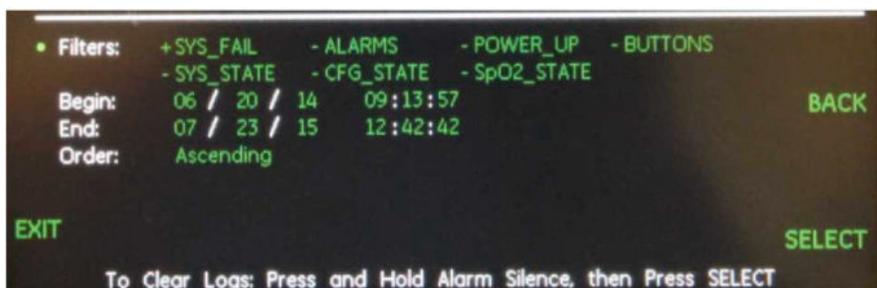
5.1.7.6.1 Event Log Options menu

Figure 5-13 Event Log Options



Filtering/sorting is accomplished by setting the +/- View/Hide symbol, date, time, and sort preference using the up or down arrow keys and **Select**. To return the cursor to the left side of the screen, push **Back**. To return to the log display screen, push **Back** again.

Figure 5-14 Filtering and sorting



Scrolling is accomplished using the up or down arrow keys in 3 selectable modes: Single Line, ½ Page, and Full Page.

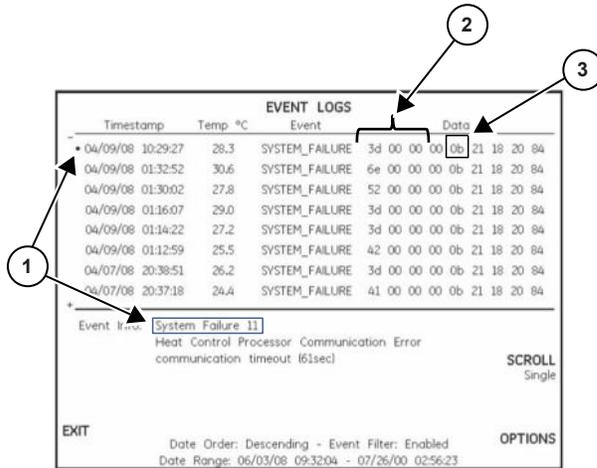
When diagnosing System failure, it is helpful to filter the *Event Logs* in Service Mode. [Figure 5-15 Example of Sys Fail 11 on page 128](#) shows an example of the *Event Logs* list only System Failures. By selecting 1 error message the interpretation of the message will appear in the lower window also shown in [Figure 5-15 Example of Sys Fail 11 on page 128](#).

NOTE

When escalating be sure to provide a photograph of 1 or more pages of the *Event Logs*. Do not download the logs: The downloaded file is not readable and requires a proprietary parsing program to make it readable.

Below example shows directions for interpreting 1 instance of Sys Fail 11.

Figure 5-15 Example of Sys Fail 11



1	Selected event
2	Auxiliary codes
3	System Failure codes Sys Fail is displayed in the fifth data pair here 0b hex = 11 decimal, therefore Sys Fail 11 is shown. See Table 5-3 on page 128 . Sys Fail 11 [xx 00 00 00] Heat control processor stopped communicating with the main application processor. (xx indicates number of seconds since last communication)

Table 5-3

Hexadecimal	Numeric
0A	System Failure 10
0B	System Failure 11
0C	System Failure 12

Table 5-4 Sys Fail + Aux Codes

Sys Fail 06 [0B XX 00 00]
Sys Fail 08 [xx xx 00 00]
Sys Fail 09 [XX 80 XX XX]
Sys Fail 09 [0A XX 00 00]
Sys Fail 09 [0B 00 00 00]
Sys Fail 10 [XX XX XX XX]
Sys Fail 11 [xx 00 00 00] -or- [FF FF FF FF]
Sys Fail 11 [AA AA AA AA]
Sys Fail 11 [FF FF FF FF]

Table 5-4 Sys Fail + Aux Codes (Table continued)

Sys Fail 12 [xx 00 00 00]

5.1.7.7 Heat Engine Diagnostic

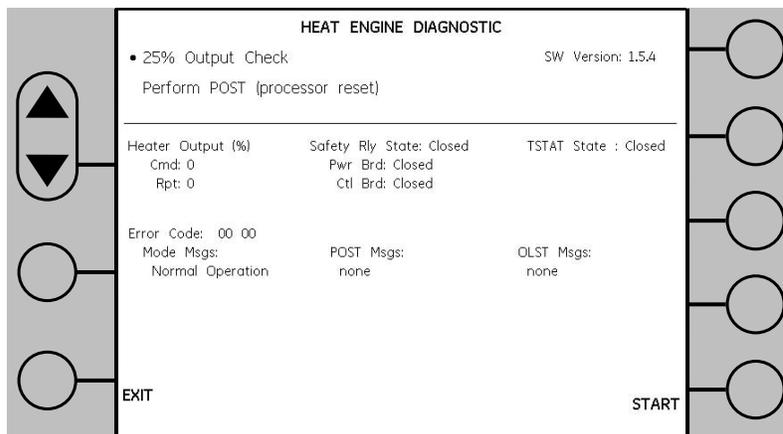
The *Heat Engine Diagnostic* menu provides 2 high level functions:

- 25% Output Test
- Perform POST (Processor Reset)

Perform Power On Self Test (POST) displays power and control board relay states, TSTAT states, heat control processor software revision, error code, POST and Online Self Test (OLST) messages, and mode messages.

To run the 25% Output Check, select the same and push **Start**. Once started, the **Cmd** field should read 25 while the **Rpt** field should read between 24% and 26%. Push **Stop** to stop the 25% Output Check.

Figure 5-16 Heat Engine Diagnostic

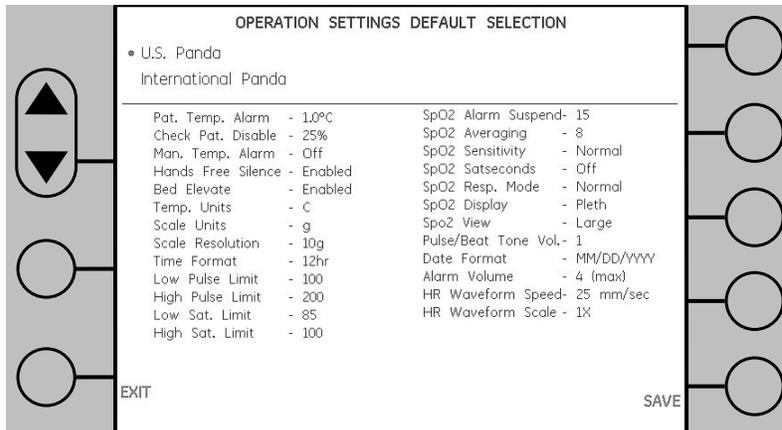


5.1.8 Set defaults

To return the operation settings to factory defaults, select US or International for the Giraffe or Panda device you have, and push **Save**. Push **Back** to move the cursor back to the left side of the screen. Push **Back** again to update the display.

Figure 5-17 Giraffe defaults



Figure 5-18 Panda defaults**NOTE**

Language is not reset.

5.2 PC command line interface

Using a PC and null modem cable gives access to an additional diagnostic screen that allows you to update system software, access logs, and perform other commands not available on the device's service mode screen.

To order the communication cable, refer to [10.2 Service tools on page 313](#).

5.2.1 Accessing the PC command line interface

Tools required

Terminal emulator program capable of XMODEM transfers

Null modem cable

1. Connect the cable to the 9-pin serial port located on the back of the device to a Windows-based PC.
2. Note the COM port number assigned to the system.

NOTE

The COM may need to be installed if it is not an option during setup.

3. Open the terminal emulator program.
4. Configure the terminal emulator with the following settings:
 - COM X – for example, COM 2
 - In Bits per second, enter **115200**.
 - In Data bits, enter **8**.
 - In Parity, enter **None**.
 - In Stop bits, enter **1**.
 - In Flow control, enter **None**.
 - Click **OK**.

5. Boot the device into service mode software if it is not already.
6. Press **Enter** on your computer. The terminal window will show a prompt (SVC>).

5.2.2 PC command line interface main menu

To view available menu selections, type **help** at the command prompt.

help	print this help text
version	print service mode version info
getbuttons	print status of pushbuttons
update	update firmware
logs	retrieve stored logs
pulsetone	play single pulsetone / set vol.
ncas	print ncas input state
dips	print ctrl brd dipswitch states
heateng	perform heat engine tests
lang	list/set available languages
lcd	display multi-color test pattern

NOTE

NCAS is an early acronym for Hands Free Alarm Silence.

NOTE

For help on a particular command, type `<command> help`. For example, to get help on the logs command, type `logs help`.

5.2.3 PC command line interface sub-menus

5.2.3.1 Version

Version has no help submenu.

5.2.3.2 getbuttons

command: getbuttons

arguments: none

function: Returns the current state (released or pushed) of the touch panel push buttons. The buttons are numbered from 1 to 11, starting with the alarm silence button and progressing counter-clockwise. For example, button1 = alarm silence, button5 = lower left button, button6 = ? button, and button11 = lower right button.

usage: getbuttons

5.2.3.3 update

NOTICE

Do not run the update command unless told to in the service procedure.

NOTICE

If you program the processor and the Exit command fails, you must run the command again until it is successful. If the command fails to run, then do not use the device and contact technical support.

NOTE

Update instructions, command variables, and materials will be provided with the update package.

command: update

arguments:

- 'proc' = processor to update
 - audio - audio processor
 - heat - heat control processor
- 'filesz' = size of the file to upload
- 'crc' = crc of the file to upload

function: Updates the specified processor with the file provided via xmodem upload. After issuing this command, the user will be prompted to send the update file via xmodem transfer. Once the file transfer is complete, the crc is checked to ensure data integrity; then the processor update (re-programming) process will begin. The touch panel buttons will be disabled while carrying out the functions of this command.

usage: update proc filesz crc

5.2.3.4 logs

Refer to [5.2.4 Engineering log dump on page 134](#).

5.2.3.5 pulsetone

command: pulsetone

arguments:

- 'vol' = desired speaker volume (optional)
 - 1 (minimum) - 4 (maximum)

function: Sets the volume to the specified level and generates a pulsetone. If the argument 'vol' is not specified, a pulsetone will be generated at the current volume setting.

usage: pulsetone [vol]

5.2.3.6 ncas

NOTE

NCAS is an early acronym for Hands Free Alarm Silence.

command: ncas

arguments: none

function: Retrieves and displays the instantaneous state of the Hands Free Alarm Silence input to the main processor. The state is reported as 'active' or 'inactive'.

usage: ncas

5.2.3.7 dips

command: dips

arguments: none

function: Reads and prints out the status of the control board DIP switches.

usage: dips

5.2.3.8 heateng

command: heateng

arguments:

- 'info' = report sw version and heater/board eeprom id's
- 'stat' = report operational state, safety relay and tstat states and heater output power
- 'check' = perform health check of heat control system, including reset, POST, and heater output check
- 'reset' = perform reset of heat control processor and report result of POST
- 'resist' = perform heater resistance calculation (via internal measurement of heater voltage and current)

function: This command performs actions and reports various parameters and operational states of the Heat Control Processor and its associated Heat Engine (heater and calibration eeprom). The user interface (LCD) cannot be in the Heat Engine Diagnostic screen when running these commands.

usage: heateng [arg]

5.2.3.9 lang

command: lang

arguments:

- action:
 - list - display available languages
 - set # - select language #, where # is the corresponding language number obtained from 'list'

function: Displays a numbered list of available languages that can be used to set the desired language.

usage: lang [list, set #]

5.2.3.10 lcd

arguments:

- state
 - 'test' to display lcd test pattern
 - 'norm' to return to normal display

function: Generates a multi-color test pattern that can be used to troubleshoot display issues. The pattern consists of 7 equally spaced color bands with 32 variations of each color (darkest on the left and brightest on the right). The color transitions should appear smooth and uniform. Abnormal displays and/or display connections can be detected by abrupt color changes that may appear as non-deliberate lines in the middle of the pattern. The 7 colors from top to bottom are: green, blue, cyan, white, magenta, yellow, and red (each separated by a thin black line). Each of the 4 corners are outlined with a 1-pixel wide white square with cross-hairs; an off-center image can thus be detected by an incomplete white box in at least 1 of the 4 corners. The touchpanel input is disabled while in test mode (returned to normal with 'lcd norm').

usage: lcd 'state'

5.2.4 Engineering log dump

Tools required

Terminal emulator program capable of XMODEM transfers

Null modem cable

1. Type **logs help** for detail on logs command.

```
SVC> help
```

The following output appears:

```
command: logs
```

```
arguments:
```

- 'dump' = retrieve log data via xmodem transfer
- 'stats' = print system log data info

```
function:
```

- The 'dump' option is used to initiate an xmodem transfer of log and other system information to a file on the connected computer which can then be sent to technical personnel for analysis and troubleshooting and attached to trouble reports (i.e., iTrack) for information congruence. The information displayed on the Unit Info screen of the service mode application and a timestamp are also included in the log file transfer.
- The 'stats' option simply lists information about the currently stored log data.

NOTE

When prompted for a filename prior to xmodem file transfer, choose a descriptive filename denoting the unit serial number and timestamp (e.g., HDJM50187-12_31_08-13_45.logs).

usage: logs [arg]

- Follow the instructions in [5.2.1 Accessing the PC command line interface on page 130](#).

NOTE

Once started, the logs utility allows little time to provide the path, select the appropriate communication protocol, and enter a file name. If your terminal utility allows, set up the directory and the target file name before starting the logs utility.

- At the SVC command prompt, type **logs dump**.

```
SVC> logs dump
```

The following menu appears:

```
Gathering system info...done
```

```
Disabling Audio Processor...done
```

```
Disabling Heat Control Processor...done
```

NOTE

Name received file with unit serial number and timestamp (for example, HDJM50187-12_31_08-13_45.logs).

```
>>> Touchpanel Disabled >>>
```

```
Size of file to be transmitted: 655872
```

```
Run local xmodem receive command now...
```

- At the Run local xmodem receive command now... prompt, start the XMODEM transfer using the terminal program. Specify a file name with the unit serial number and timestamp - for example, HDJM50187-12_31_08-13_45.logs. Click **OK**.
- Type in a filename with unit serial number and timestamp (for example, HDJM50187-12_31_08-13_45.logs) and click **OK**.

If the transfer is unsuccessful, the terminal will show the following output:

```
*****
xmodem error: -69
*****
```

NOTE

It will take approximately 3 to 5 minutes to complete the download.

When complete, the following output appears:

```
xmodem transfer complete
bytes transferred = 655872
crc = 54828
```

NOTE

The values for bytes transferred and crc will likely differ from the ones shown on screen.

The file will now have the complete download log data and in the location identified earlier.

Send the log file to Tech Support for Engineering analysis.

Chapter 6 Troubleshooting

6.1 Troubleshooting information

This section is intended to provide a technical troubleshooting guide for GE Healthcare employees including, but not limited to, engineers, technicians, and service personnel.

The procedures described in this troubleshooting guide should be performed by trained and authorized personnel only. Service should only be undertaken by competent individuals who have a general knowledge of and experience with devices of this nature. No repairs should ever be undertaken or attempted by anyone not having such qualifications.

Read completely through each step in every procedure before starting the procedure. Any exceptions may result in a failure to properly and safely complete the attempted procedure.

After completing a repair, perform the checkout procedure to make sure the device is in proper operating condition. In addition, a final electrical safety check and leakage current test must be performed. If the device fails any steps of the checkout procedure, it must be removed from service and repaired. Record the information for future reference.

Tools and materials

Hand tools/test equipment

See [10.1 Hand tools on page 313](#) for a list.

6.1.1 Troubleshooting definitions and acronyms

Table 6-1 Troubleshooting definitions and acronyms

Term	Definition
PCA	Printed circuit assembly
PCB	Printed circuit board
LCD	Liquid crystal display
Mains	AC electric power source
DMM	Digital multi-meter. An electronic measuring instrument that combines several functions in 1 device.
Digital multimeter	An electronic instrument that measures electrical resistance.
PE	Protective earth grounding point
FE	Functional earth grounding point
E-Base	Elevating base
T-Stat	Thermostat
POST	Power-on self test
Heat control processor	Microcontroller located on the power PCA that controls the radiant heater.
Main application processor	Microprocessor located on the control PCA that provides system communication, control, and user interface.

Table 6-1 Troubleshooting definitions and acronyms (Table continued)

Term	Definition
Audio processor	Microcontroller on the control PCA that provides audio and power fail functions.
NCAS processor	Microcontroller on the alarm/light PCA that provides Hands Free Alarm Silence and procedure light control.
HFAS and NCAS	Hands Free Alarm Silence and Non-Contact Alarm Silence (both refer to the same feature)
Probe panel interface board	Flexible printed circuit assembly used to connect the rail harnesses to the control PCA.
SpO2 flex circuit	Flexible printed circuit assembly used to connect the SpO2 I/F PCA to the SpO2 probe panel connector.
HR	Heart Rate option
CC14	ECG acquisition board

6.2 Troubleshooting tables

6.2.1 Lighting – procedure light

6.2.1.1 No Light

Table 6-2 No Light

Possible causes	Step	Troubleshooting procedure	Comments
Burned-out or defective bulb	1	Turn off procedure light switch and power standby switch. Disconnect mains.	
	2	Remove procedure light assembly from heater head.	
	3	Using Ohm meter, remove and test halogen bulb for continuity (<1 Ohm).	
	4	If “open”, replace bulb, test, and re-assemble. If “low resistance” (<1 Ohm), continue.	See Figure 7-2 Heater engine on page 171 .
12V DC power source or control circuitry	5	Connect mains. Turn on power standby switch and procedure light switch.	
	6	Using DC volt meter, check voltage from chassis to each contact of bulb socket. Verify that 1 contact measures 12V DC.	
	7	If DC voltage OK, remove upper housing and go to Step 27 on page 139 . If DC voltage not present, continue.	
No mains power to 12V DC power supply	8	Turn off power standby switch. Remove rear panel on electronic enclosure.	ESD protection is required.
	9	Disconnect AC output connector, J28, from power PCA. Turn on power standby switch.	
	10	Using AC volt meter, test for AC voltage at pins J28-1 (N) and J28-4 (L) on power PCA.	

Table 6-2 No Light (Table continued)

Possible causes	Step	Troubleshooting procedure	Comments
	11	If AC voltage OK, remove upper housing and go to Step 23 on page 139 . If AC voltage not present, continue.	
AC short causing blown fuse	12	Turn off power standby switch. Disconnect AC power source.	
	13	On power PCA: Remove and test fuses F3 (N) and F6 (L). Note the blown fuse location.	
AC short on power PCA	14	Reinstall/replace fuses. Using Ohm meter, test for short on power PCA by measuring from chassis to pin 1, chassis to pin 4, and pin 1 to pin 4.	
	15	If any shorts are found, remove and replace power PCA. If open, re-connect J28 on power PCA and continue.	
AC short in wiring to 12V DC power supply	16	Re-Test for shorts by back-probing J28 on the power PCA from chassis to pin 1, chassis to pin 4, and pin 1 to pin 4.	
	17	If short, remove upper housing and continue. If open, go to Step 23 on page 139 .	
AC short in 12V DC power supply	18	Disconnect AC input connector (J1) on (East side) 12V DC power supply. Test the mating connector from chassis to pin 1, chassis to pin 3, and pin 1 to pin 3.	See 7.9 Harness list on page 202 .
	19	If short, disconnect in-line connectors to the PF choke. If short went away, then proceed to Step 21 on page 139 .	
	20	If still short, replace PF choke. If short went away, replace harness.	
	21	If open, test power supply.	
No DC power supply	22	Reconnect all harnesses and turn power standby switch ON.	
	23	Using AC volt meter, check for mains voltage at power supply input connector pins 1-3.	
Disconnected/faulty harness	24	If AC voltage not present, turn OFF and check for open in harness. If AC voltage OK, continue.	
	25	Turn ON power standby switch and using a DC volt meter, backprobe J2 pins 2, 5 on 12V DC power supply and check for 12V DC.	
	26	If DC voltage not present, replace 12V DC power supply. If DC voltage OK, continue.	
Faulty procedure light harness	27	Turn OFF and disconnect J33 on alarm/light PCA and DC output connector on 12V DC power supply.	

Table 6-2 No Light (Table continued)

Possible causes	Step	Troubleshooting procedure	Comments
	28	With a good bulb installed, check for continuity through the bulb, pin 1 of 12V DC power supply connector to J33 pin 1 at alarm/light PCA connector.	
	29	If digital multimeter test fails, replace procedure light assembly. If OK, continue.	
	30	Using Ohm meter, check J33 pins 3, 4 on procedure light assembly harness. Procedure light switch On = Short (about .5 Ohm); switch Off = Open.	
	31	Reconnect and turn ON. If Ohm meter test fails, replace procedure light assembly. If OK, continue.	
	32	Check for 12V DC on pins 1,2 on procedure light assembly harness of J33 alarm/light PCA. If OK, continue. If voltage not present, replace procedure light assembly.	
Faulty alarm/light PCA ribbon cable	33	Reconnect and check for 3.3V at J32 pins 1,6.	
	34	Check connection of ribbon cable at alarm/light PCA and control PCA.	
Defective alarm/light PCA	35	If OK, replace alarm/light PCA.	

6.2.2 Lighting – observation lights

6.2.2.1 Light output flickers at lowest setting

Table 6-3 Light output flickers at lowest setting

Possible causes	Step	Troubleshooting procedure
Mains voltage too low	1	Using DMM, measure AC voltage at accessory outlet.
	2	Light output may flicker if mains voltage is <10% below nominal.
Mains power quality	3	Light output may flicker if mains voltage is distorted or heavily loaded.

6.2.2.2 Light output dim at highest setting

Table 6-4 Light output dim at highest setting

Possible causes	Step	Troubleshooting procedure	Comments
Mains power too low	1	Using DMM, measure AC voltage at accessory outlet.	
	2	Light output may appear dim if mains voltage is <10% below nominal.	

Table 6-4 Light output dim at highest setting (Table continued)

Possible causes	Step	Troubleshooting procedure	Comments
Wrong observation light transformer	3	To verify, remove observation light bracket and verify part number and model number of the electronic transformer harness.	See 7.9 Harness list on page 202 for 115V or 230V harness.

6.2.2.3 Lights stay dim with switch off

Table 6-5 Lights stay dim with switch off

Possible causes	Step	Troubleshooting procedure	Comments
Defective switch in dimmer pot harness	1	Open rear cover and disconnect harness at J25 power PCA.	
	2	Using DMM, check resistance on harness pins 3, 6 (white wires). Switch Off = Open; switch On = < 1 Ohm.	
	3	If switch test fails, replace dimmer harness and re-test.	See 7.9 Harness list on page 202 .
Defective power PCA	4	Disconnect transformer connector J24.	
	5	Measure AC out across J24 pins 3,4. Dimmer switch OFF = 0V; dimmer switch ON = mains voltage.	
	6	If test fails, replace power PCA.	

6.2.2.4 Lights are not dimmable

Table 6-6 Lights are not dimmable

Possible causes	Step	Troubleshooting procedure	Comments
Defective potentiometer in dimmer pot harness	1	Open rear cover and disconnect harness at J25 on power PCA.	
	2	Using DMM, check resistance on harness pins 2, 5 (blue wires). Resistance range: ~1Meg (dim) to 0 Ohms (bright) as the dimmer knob is rotated.	
	3	Connect a new dimmer harness at power PCA, J25, and re-test.	See 7.9 Harness list on page 202 .
	4	If problem is fixed, install the new harness.	
Defective transformer	5	If dimmer pot is OK, replace the transformer subassembly.	

6.2.2.5 1 bulb does not light

Table 6-7 1 bulb does not light

Possible causes	Step	Troubleshooting procedure	Comments
Bad bulb	1	Remove observation light assembly.	
	2	Disconnect bulb from socket. Test bulb with Ohm meter (should be < 1 Ohm).	

Table 6-7 1 bulb does not light (Table continued)

Possible causes	Step	Troubleshooting procedure	Comments
	3	Replace bulb if continuity test fails.	
Bad harness/bad socket	4	Open rear cover and disconnect harness at J26 on power PCA.	
Open in lamp wiring	5	With all bulbs installed, check continuity at harness pins 1-3, and 2-4.	East side bulb: pins 1, 3 West side bulb: pins 2, 4
Short in lamp wiring	6	With all bulbs removed, check for open at harness pins 1-3, and 2-4.	
	7	If either continuity test fails, remove upper housing and troubleshoot wiring.	
Bad socket	8	Disconnect 2 pin connector located behind bulb socket. With new bulb installed, check continuity through bulb (should be < 4 Ohms).	See 7.9 Harness list on page 202 .
	9	If continuity test fails, replace bulb socket harness.	
Bad harness connection	10	Check that connectors at transformer harness (J24), dimmer pot (J25), and observation lights (J26) on the power PCA are seated properly.	

6.2.2.6 Both bulbs do not light

Table 6-8 Both bulbs do not light

Possible causes	Step	Troubleshooting procedure
	1	Check lamp wiring. (Refer to steps 4-6 in 6.2.2.5 1 bulb does not light on page 141 .)
No mains to transformer	2	Open rear cover and disconnect transformer harness (J24) at power PCA.
	3	Using DMM, check for mains voltage at J24 pins 3 and 4 on the power PCA with dimmer pot turned on.
Bad dimmer pot switch	4	If no mains, verify switch in dimmer pot harness. (Refer to 6.2.2.3 Lights stay dim with switch off on page 141 .)
Bad fuse	5	If no mains, check fuses F11 and F12 on power PCA.
Bad relay on power PCA	6	If fuses and dimmer pot OK, replace power PCA.
Bad transformer	7	Re-connect transformer harness (J24) at power PCA. Transformer output must have at least 1 good bulb attached to check output (lamp voltage).
	8	Using DMM, back-probe J26 pins 1-3 or 2-4. Depending on dimmer pot setting, voltage range will be 8 to 12 VAC.
	9	If no lamp voltage, replace transformer assembly.

6.2.3 Display – LCD and backlights

6.2.3.1 White display, striped display, or color shift

Table 6-9 White display, striped display, or color shift

Possible causes	Step	Troubleshooting procedure	Comments
Poor LCD cable connection	1	Check LCD cable connection at control PCA (J1).	See 7.9 Harness list on page 202 .
	2	If OK, check the LCD cable connection at LCD module.	
	3	If OK, replace LCD module.	

6.2.3.2 Distorted display: test or random pattern

Table 6-10 Distorted display: test or random pattern

Possible causes	Step	Troubleshooting procedure
Main application software not loaded	1	Reload main application code (MAP software).

6.2.3.3 Dim or non-uniform light

Table 6-11 Dim or non-uniform light

Possible causes	Step	Troubleshooting procedure
Bad LCD backlight	1	The backlight may not be connected to the LED driver board mounted on the control board. Check to make sure connections are mated correctly as well as any bent pins.
	2	If OK, disconnect the LCD cable at the control PCA. Turn on device and examine for non-uniform lighting.

6.2.3.4 Blank black screen (with no alarms)

Table 6-12 Blank black screen (with no alarms)

Possible causes	Step	Troubleshooting procedure	Comments
Loss of 12V to control PCA	1	Check to make sure the LED7 light is lit on the control PCA. If the light is red, then the LCD module is receiving power.	
LCD backlight is not connected to the LED driver board on the control board	2	Check the power cable between the control PCA and power PCA for correct pins.	See 7.9 Harness list on page 202 .
	3	Check fuse F7 on power PCA.	
	4	Check backlight connection to the LED driver board.	
	5	Replace the control PCA. If backlights still do not work, replace LCD module.	

6.2.3.5 Display arrow present after installing new LCD

Table 6-13 Display arrow present after installing new LCD

Possible causes	Step	Troubleshooting procedure
Protective film on LCD	1	Disassemble electronics enclosure and remove protective film on LCD.

6.2.3.6 Black background has red, green, or blue tint

Table 6-14 Black background has red, green, or blue tint

Possible causes	Step	Troubleshooting procedure	Comments
Bad LCD cable connection	1	Check LCD cable connection at control PCA (J1).	
	2	If OK, check the LCD cable connection at LCD module.	
Defective LCD cable	3	Remove and replace LCD cable.	See 7.9 Harness list on page 202 .

6.2.4 User interface – touch panel

6.2.4.1 Button not working

Table 6-15 Button not working

Possible causes	Step	Troubleshooting procedure	Comments
Disconnected touch panel	1	Verify proper connection of touch panel at J5 on control PCA.	
Touch panel - defective switch	2	Go into service mode and diagnose using the touch panel test.	
	3	If unable to enter service mode via buttons, refer to alternate method in 6.2.4.2 Cannot enter service mode on page 144 .	
	4	Enter diagnostics -> button test.	
	5	If the diagnostic test indicates either open or shorted buttons, replace touch panel.	See Figure 7-3 Electronics enclosure on page 173 .

6.2.4.2 Cannot enter service mode

Table 6-16 Cannot enter service mode

Possible causes	Step	Troubleshooting procedure
? or Alarm Silence button not working	1	Locate an 8-position dipswitch on the control PCA. Push the first dipswitch, located on the left side, up to the ON position (dip position 1). The device will go directly into service mode during next power on.
	2	Go into service mode and diagnose with the touch panel test.

6.2.4.3 Sys Fail 08 [xx xx 00 00]

Table 6-17 Sys Fail 08 [xx xx 00 00]

Possible causes	Step	Troubleshooting procedure
Touch panel - button shorted	1	Refer to 6.2.5.7 Sys Fail 08 [xx xx 00 00] on page 146.

6.2.5 System failure – Sys Fail message

When troubleshooting a system failure condition, always record the error list or download the event log.

6.2.5.1 Sys Fail 01 [FF xx xx xx]

Problems indicated with FLASH memory - file system error

Table 6-18 Sys Fail 01 [FF xx xx xx]

Possible causes	Step	Troubleshooting procedure
Incorrect software loading	1	Reload software. Reprogram the main application flash.
Defective control PCA	2	Replace control PCA.

6.2.5.2 Sys Fail 02

Reported power from power PCA does not match commanded power from control PCA.

Table 6-19 Sys Fail 02

Possible causes	Step	Troubleshooting procedure
Power PCA failure	1	Run heat engine health check in service mode.
Heater connection failure	2	Check connections from the control PCA to the power PCA and from the power PCA to the heat engine.
Power PCA failure	3	If problem persists, replace power PCA.

6.2.5.3 Sys Fail 03

Memory error occurred.

Table 6-20 Sys Fail 03

Possible causes	Step	Troubleshooting procedure
NVRAM failure	1	Verify the cover of NVRAM chip on the control PCA is properly seated (NVRAM chip cover retains NVRAM battery).
	2	Reprogram the main application flash. Go into service mode and reset defaults.
Control PCA failure	3	If problem persists, replace control PCA.

6.2.5.4 Sys Fail 04

Redundant stored variables do not match (memory redundancy error).

Table 6-21 Sys Fail 04

Possible causes	Step	Troubleshooting procedure
NVRAM corrupt	1	Reprogram the main application flash.
Control PCA failure	2	Replace control PCA.

6.2.5.5 Sys Fail 05

ADC configuration error or ADC failure: reference channel outside of range (1597-1775).

Table 6-22 Sys Fail 05

Possible causes	Step	Troubleshooting procedure	Comments
Improper NVRAM initialization	1	Reset NVRAM defaults.	No service tool available at this time.
	2	Replace control PCA.	

6.2.5.6 Sys Fail 06 [0B XX 00 00]

Over temp T-Stat is open (new addition to MAP Version 1.1.0 and later).

Refer to [6.2.5.13 Sys Fail 11 \[AA AA AA AA\]](#) on page 150 for additional information.

Table 6-23 Sys Fail 06 [0B XX 00 00]

Possible causes	Step	Troubleshooting procedure	Comments
Open overtemp T-Stat	1	Check for blockage of heater duct and heater head vents.	
Defective T-Stat or harness	2	Check T-Stats or harness by disconnecting J20 on the power PCA. Using Ohm meter on the harness connector, verify each T-Stat is closed by measuring < 1 Ohm across the 2 pins. (Refer to the comments to right.)	East T-Stat: pins 3 and 4 West T-Stat: pins 7 and 8
Defective power PCA	3	Replace power PCA.	

6.2.5.7 Sys Fail 08 [xx xx 00 00]

Touch panel button shorted.

Table 6-24 Sys Fail 08 [xx xx 00 00]

Possible causes	Step	Troubleshooting procedure
Pushing only 1 button during power on		If trying to enter service mode, only 1 button is pushed. Make sure both buttons are depressed when attempting to enter service mode.
Bad touch panel	1	Enter service mode diagnostics and check button function. Verify touch panel operation using service mode to tell which buttons are pushed.
	2	Check connection from touch panel to control PCA.
	3	Disconnect touch panel connector to control PCA.
	4	Re-Power on to test for system failure 8.

Table 6-24 Sys Fail 08 [xx xx 00 00] (Table continued)

Possible causes	Step	Troubleshooting procedure
Control PCA failure	5	If OK, then replace touch panel. If still bad, replace control PCA.

6.2.5.8 Sys Fail 09 [XX 80 XX XX] / [XX 10 XX XX] / [XX 50 XX XX] / [0A XX 00 00]

Heat control processor failure occurred during run time. Heater control failure.

Communication between heat control and the main processors must be intact to get a Sys Fail 09. The 2 cannot overlap. Whereas, an intermittent Sys Fail 11 condition will mask Sys Fail 09. If both are reported, Sys Fail 11 should be fixed first, be aware that, a Sys Fail 09 may then present itself when the communication is restored, and there may be a different cause for the SYS fail 09 which needs to be debugged according to the respective sections.

If the issue is not repeatable, it is most likely a loose cable or intermittent connection issue. Inspect wiring and crimp contact terminals for loose or poor connections. Reconnect the cables and make sure the connectors are latched.

Carefully review all reported System Failures before beginning any troubleshooting procedures.

NOTE

When diagnosing System Failure, it is helpful to filter the ON SCREEN EVENT LOGS in Service Mode.

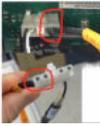
To show Sys Fail messages only see [5.1.7.6 Event Logs on page 126](#).

Take a photo of the On-Screen Event Logs (filtered for Sys Fail) to share with Tech Support if needed.

Table 6-25 Sys Fail 09 [XX 80 XX XX] / [XX 10 XX XX] / [XX 50 XX XX] / [0A XX 00 00]

Possible causes	Step	Troubleshooting procedure	Comments
Defective Heat engine connection	1	Check heat engine cable connector is properly seated and latched to J29 on the power board and verify if the connector terminals are properly inserted. Refer image below. 	Insert the connector terminal properly into the connector housing until a locking tick sound is heard and reboot the warmer. Make sure all the terminals look alike when seen from outside the plastic housing.

Table 6-25 Sys Fail 09 [XX 80 XX XX] / [XX 10 XX XX] / [XX 50 XX XX] / [0A XX 00 00] (Table continued)

Possible causes	Step	Troubleshooting procedure	Comments
Defective Heat Engine	2	<p>Measure the heat engine resistance across the pins 1 and 2 of the connector J29 from the power board from the back side (solder side) without removing connector from the board.</p>  <p>Replace Heat engine if the multimeter measures open circuit (high resistance e.g.: > 1 k hm)</p> <p>If the heat engine is not measuring open circuit, turn ON the warmer in-service mode and proceed to Heat engine diagnosis section. Click 'Perform POST' in quick succession for 5 times. If the diagnostic passes after the first few attempts, it is possible that the heat engine has failed due to drift in resistance.</p> <p>Confirm the same by allowing the warmer to cool down by switching it OFF and attempting a power ON again to see a Sys Fail 09. If the failure repeats, replace heat engine.</p> <p>If the measured heat engine resistance is less than 20 ohms and greater than 35 ohms (for 115 V heater), less than 80 ohms and greater than 120 ohms (for 230 V), the heat engine is defective. Replace the heat engine.</p>	Do not replace Power PCA if any of these symptoms persist.
Heater Control Failure/ Broken/ defective SSR	3	Replace Power PCA.	

NOTE

A defective control board could also cause a Sys Fail 09 but the probability is very remote. Replace the Control PCA if and only if the above steps do not rectify the issue. If the Audio Processor (Sonny) gets reset during run time, the safety relay will open causing a Sys Fail 09 0A 00 00 00.

6.2.5.9 Sys Fail 09 [0B 00 00 00]

Heat control processor failure occurred during run time. Open T-Stat.

Table 6-26 Sys Fail 09 [0B 00 00 00]

Possible causes	Step	Troubleshooting procedure	Comments
Open T-Stat	1	Refer to steps under 6.2.5.6 Sys Fail 06 [0B XX 00 00] on page 146.	All Giraffe and Panda iRes Warmers with MAP firmware version 1.0.7 through 1.0.9

6.2.5.10 Sys Fail 09 [0E 72 00 00]

Heat control processor failure during start up. Disconnected heater cable.

Table 6-27 Sys Fail 09 [0E 72 00 00]

Possible causes	Step	Troubleshooting procedure
Disconnected heater cable	1	Check the heat engine cable connector is fully seated and latched to J29 on the power board and verify if the connector terminals are properly inserted. Replace heater assembly only if reconnecting heater cable does not solve the issue.

6.2.5.11 Sys Fail 10 [XX XX XX XX]

Self-calibration failure occurred.

Table 6-28 Sys Fail 10 [XX XX XX XX]

Possible causes	Step	Troubleshooting procedure
Control PCA failure	1	Replace control PCA.

6.2.5.12 Sys Fail 11 [xx 00 00 00] -or- [FF FF FF FF]

Heat control processor stopped communicating with the main application processor. (xx indicates number of seconds since last communication)

If the issue is not repeatable, it is most likely a loose cable issue. Reconnect the cables.

Carefully review all reported System Failures before beginning any troubleshooting procedures.

NOTE

When diagnosing System Failure, it is helpful to filter the ON SCREEN EVENT LOGS in Service Mode.

To show Sys Fail messages only see [5.1.7.6 Event Logs on page 126](#).

Take a photo of the On-Screen Event Logs (filtered for Sys Fail) to share with Tech Support if needed.

Table 6-29 Sys Fail 11 [xx 00 00 00] -or- [FF FF FF FF]

Possible causes	Step	Troubleshooting procedure	Comments
Defective/disconnected cable	1	Check ribbon cable between power and control PCA's is properly seated. If not, reseal the ribbon cable.	20 pin ribbon cable part #: 6600-1411-601
	2	Verify +5V DC at TP20 pin 2 on the power PCA. If not present, replace power PCA.	DMM
	3	Verify status of Reset input signal at TP21 pin 2 on the power PCA is high (>2V). If yes, go to Step 6 on page 149 .	DMM
	4	If reset input signal at TP21 pin 2 on power PCA is < 2V, first replace the communication ribbon cable.	
	5	If the problem persists, replace the control PCA.	
	6	If the reset signal status in step 3 is valid, check fuses F9 & F10 on power PCA. Replace fuses as necessary. (Also see Step 8 on page 150 .)	DMM
	7	If fuses F9 and F10 are OK or if the problem persists, replace the power PCA after completing step 9.	

Table 6-29 Sys Fail 11 [xx 00 00 00] -or- [FF FF FF FF] (Table continued)

Possible causes	Step	Troubleshooting procedure	Comments
Open or loose heater AC fuse connection (at power on)	8	If fuse F9 or F10 is discovered to be loose in its clip mounts, replace the power PCA. Do not attempt to repair it by bending the clips.	
Open or loose DC power supply connector	9	<p>Check DC power supply connector J2 for connector integrity (as shown below). This view shows the power supply, which is located on the right side of the warmer, when facing the back of the warmer, with the upper heater housing moved. The connector should be firmly seated onto the power supply.</p> <p>Verify if black and red wire are firmly connected to the connector. Check for poor connection, bad crimps and/ or contacts loose in the connector plastic housing.</p> <p>Wiggle the wires near the connector to see if the SYS FAIL 11 is repeatable.</p> <p>Check for a firm connection between the connector and the power supply:</p> <ol style="list-style-type: none"> 1. Gently pull out on the white connector. 2. Gently push up and down on the white connector. <p>Wait at least 3 minutes with the device in normal mode.</p> <p>If SYS FAIL 11 is repeatable by any of the steps explained above, then replace the Harness Heater/ T-Stat/Power Supply cable.</p> 	Harness, Heater/T-stat/ Power Supply cable part number: 6600-1558-700 connected to the DC power supply on right hand side of the heater head (when viewed from back of the warmer)

6.2.5.13 Sys Fail 11 [AA AA AA AA]

No communication of heat control processor with the main application processor since power ON.

Table 6-30 Sys Fail 11 [AA AA AA AA]

Possible causes	Step	Troubleshooting procedure	Comments
Defective/disconnected cable	1	Check ribbon cable between power and control PCA's is properly seated. If OK, replace control PCA.	20 pin ribbon cable part #: 6600-1411-601
Wrong mains voltage	2	If device is plugged into the wrong mains voltage (or mains voltage too high/low) then power PCA will fail POST (Power-On Self Test).	
Open or loose heater AC fuse connection	3	If the alarm has occurred during normal run time, check fuses F9 and F10 on power PCA. Replace fuses as necessary.	
	4	If fuses F9 and F10 are OK or if the problem persists, replace the power PCA.	
	5	If fuse F9 or F10 is discovered to be loose in its clip mounts, replace the power PCA. Do not attempt to repair it by bending the clips.	

Table 6-30 Sys Fail 11 [AA AA AA AA] (Table continued)

Possible causes	Step	Troubleshooting procedure	Comments
Open T-Stat at power on	6	If the device has been in recent use and this alarm has occurred about 1 minute after a power on attempt, shut down and power up in service mode.	Refer to TB MIC 08 011 for more information. Affected units: All Giraffe and Panda iRes Warmers with MAP Firmware version 1.0.7 through 1.0.9
	7	Review the Errors list. Look for the presence of a Sys Fail 09 0B or Sys Fail 06. If this pattern exists, then the heater head has overheated, and the thermostat has opened. (Follow steps under 6.2.5.6 Sys Fail 06 [0B XX 00 00] on page 146.)	
	8	Check for and remove any obstructions of the heater head cooling vents.	
	9	Allow the device to cool with power off for at least 30 minutes and then recheck it.	

6.2.5.14 Sys Fail 11 [FF FF FF FF]

Heat control processor communication message failed.

Table 6-31 Sys Fail 11 [FF FF FF FF]

Possible causes	Step	Troubleshooting procedure	Comments
Defective/disconnected cable	1	Check ribbon cable between power and control PCA's is properly seated. If OK, replace control PCA. NOTE Replace Control PCA only if the SYS Fail 11 does not get rectified by re-seating the ribbon cable.	20 pin ribbon cable part #: 600-1411-601

6.2.5.15 Sys Fail 12 [xx 00 00 00]

Audio processor stopped communicating with the main application processor. (xx indicates number of seconds since last communication.)

Table 6-32 Sys Fail 12 [xx 00 00 00]

Possible causes	Step	Troubleshooting procedure
Control PCA failure	1	Replace control PCA.

6.2.5.16 Blank screen, alarm lights or indicator lights on, High Priority alarm

There was a loss of communication from main application processor.

1. Reload the main application code.
2. If problem persists, replace control PCA.

6.2.5.17 Red screen, alarm lights or indicator lights flashing, High Priority alarm

NVRAM failure occurred.

Table 6-33 Red screen, alarm lights or indicator lights flashing, High Priority alarm

Possible causes	Step	Troubleshooting procedure
Real time clock/NVRAM failure	1	Confirm that the following message appears on the ThermoLink port: Unrecoverable NVRAM error
	2	Re-load software and re-test.
	3	If error still occurs, replace control PCA.

6.2.6 Alarms/indicators

6.2.6.1 No audible power fail alarm

Table 6-34 No audible power fail alarm

Possible causes	Step	Troubleshooting procedure	Comments
Defective buzzer on alarm light PCA or indicator light PCA	1	Put device in power fail. Check that the power fail LED is lit. If lit, replace the alarm/light PCA. If not, proceed to Step 2.	
	2	Check the ribbon cable connections at control PCA and alarm/light PCA to make sure it is properly seated.	See 7.9 Harness list on page 202 .
	3	Check the front panel switch connections to the control PCA to make sure it is properly seated.	
Defective battery	4	If light is still not lit, check the battery voltage in service mode. Replace battery if reading is < 3V.	

6.2.6.2 No audio indication of alarms

Table 6-35 No audio indication of alarms

Possible causes	Step	Troubleshooting procedure	Comments
Disconnected speaker	1	Check the inline connection between the speaker harness and the power standby switch harness. Make sure pins are properly seated and correctly connected.	See 7.9 Harness list on page 202 .
	2	Check the connection from the door switch harness at the control PCA (J13).	
	3	Check solder connections at the back of the speaker.	
	4	If there is still no audio, replace the speaker. If replacing the speaker does not work, replace the control PCA.	

6.2.6.3 Hands Free Alarm Silence does not work

Table 6-36 Hands Free Alarm Silence does not work

Possible causes	Step	Troubleshooting procedure	Comments
Too much ambient sunlight	1	Make sure that the device is not placed in areas with excessive sunlight, such as under a skylight. Also, make sure that procedure light and observation lights are not at the highest settings, as the bright light may affect infrared signals to the alarm/light PCA.	
Alarm/light PCA not programmed	2	Turn on procedure light. If procedure light does not light, replace the alarm/light PCA.	
	3	Or: In service mode, check the software versions. Make sure that the alarm processor indicates a software version.	
Function has been disabled or is not enabled in software	4	In setup, verify hands free silence is enabled. If it cannot be enabled, check the service mode setting to make sure HFAS is enabled and save settings.	
Open connection	5	Check ribbon cable from the control PCA to the alarm/light PCA. Make sure it is properly seated and correctly connected. Replace as necessary.	See 7.9 Harness list on page 202 .
	6	Go into service mode diagnostics > touch panel buttons > test function > hands free alarm . Perform the test, making sure that the display screen reads pushed and released at the correct time when a hand is waved in front of the alarm panel.	
Defective emitter/receiver circuit	7	Replace the alarm/light PCA.	
Defective control PCA	8	Check/replace the control PCA.	

6.2.6.4 Distorted audio speaker

Table 6-37 Distorted audio speaker

Possible causes	Step	Troubleshooting procedure	Comments
Defective speaker	1	Replace the speaker.	See Figure 7-4 Power board and outlet panel on page 176 .

6.2.7 Electronics – patient temperature probe

6.2.7.1 Alarm message: “Temp Probe Failure”

Table 6-38 Alarm message: “Temp Probe Failure”

Possible causes	Step	Troubleshooting procedure	Comments
Defective probe	1	Using service mode, check A/D inputs. Should see the same value for patient probe thermistors 1 and 2.	
	2	Check if probe is seated properly. If OK, replace patient probe.	

Table 6-38 Alarm message: “Temp Probe Failure” (Table continued)

Possible causes	Step	Troubleshooting procedure	Comments
Defective rail harness	3	Remove upper housing and check patient probe rail harness connection at the probe panel interface board (J54).	See 7.9 Harness list on page 202 .
	4	Make sure connections are correct and properly seated.	
	5	With a patient probe connected and the 4-pin connector that mates to the probe panel interface board disconnected, check continuity of harness by probing the 4-pin connector.	
Defective probe panel interface board	6	Using DMM, verify pin 1-4 = pin 2-4 = 10,000 ohms at 25C. If not equal, replace rail harness; If OK, continue.	
	7	Check for properly seated connection at control PCA, J2.	See Figure 7-3 Electronics enclosure on page 173 .
Defective control PCA	8	Remove and replace probe panel interface board.	
	9	Replace control PCA.	

6.2.7.2 Alarm message: “Confirm Probe Jack Connection”

Table 6-39 Alarm message: “Confirm Probe Jack Connection”

Possible causes	Step	Troubleshooting procedure	Comments
Defective probe	1	Check if probe is seated properly. If OK, replace patient probe.	
Cold probe	2	If probe is < 24°C, then the device will display "Confirm Probe Jack Connection".	
Defective rail harness	3	Remove upper housing and check patient probe rail harness connection at the probe panel interface board (J54).	See 7.9 Harness list on page 202 .
	4	Make sure connections are correct and properly seated.	
	5	With a patient probe connected and the 4-pin connector that mates to the probe panel interface board disconnected, check continuity of harness by probing the 4-pin connector.	
Defective probe panel interface board	6	Using DMM, verify pin 1-4 = pin 2-4 = 10,000 ohms at 25°C. If not equal, replace rail harness; If OK, continue.	
	7	Check for properly seated connection at control PCA, J2.	See Figure 7-3 Electronics enclosure on page 173 .
Defective control PCA	8	Remove and replace probe panel interface board.	
	9	Replace control PCA.	

6.2.8 Electronics – scale (bedded only)

6.2.8.1 No scale icon displayed

Table 6-40 No scale icon displayed

Possible causes	Step	Troubleshooting procedure
Improper scale connection	1	Check scale connection at probe panel.
Defective cable	2	Check cable continuity. Repair or replace cable.
Defective printed circuit board	3	Replace the printed circuit board.
Defective scale receptacle on unit	4	Replace the scale receptacle on the unit.

6.2.8.2 Defective scale

Table 6-41 Defective scale

Possible causes	Step	Troubleshooting procedure	Comments
Defective scale rail harness	1	Plug in a known good scale. If the problem persists, continue.	
	2	Remove the upper housing. Check to see harness is properly seated and connected to mating connector (probe panel interface board, J53).	
	3	Disconnect scale harness at the probe panel interface board. Plug in replacement cable and re-test. Replace harness as necessary.	See 7.9 Harness list on page 202 .
	4	Check the probe panel interface board connection at the control PCA (J2). If OK, then there is either a problem with the probe panel interface board or control PCA.	
	5	Replace the probe panel interface board or control PCA as necessary.	

6.2.8.3 Scale troubleshooting symptoms

Table 6-42

Symptom	Possible cause	Troubleshooting procedure
Scale does not return a weight.	Hardware issue or miscalibration	<ol style="list-style-type: none"> 1. Perform the 3.2.5.1 Scale hardware check on page 94. 2. Perform the 3.2.5.3 Center weight check on page 95 and 3.2.5.4 Off center weight check on page 95. Calibrate the scale if necessary (see 4.1 Scale calibration (bedded only) on page 117). 3. Remove the load cell cover and confirm that the load cells are installed with the correct orientation (see Figure 8-89 Correctly oriented load cell on page 303).
All weights are returned because the scale exceeds the maximum weight in run mode.		
Weight is displayed as SC: 40000 on the service screen.		
Scale cannot be calibrated (calibration times out).		
Scale gives erratically different weights (changing by more than 10%).		

Table 6-42 (Table continued)

Symptom	Possible cause	Troubleshooting procedure
Scale gives consistently inaccurate weights either by a set number of grams (large or small) or by a set percentage.		
Scale is stuck on <i>Lift Baby, Hold Baby</i> , or <i>Replace Baby</i> screen for more than 45 seconds per screen.	Software malfunction	<ol style="list-style-type: none"> 1. Cancel the weight sequence and start over. 2. Wait up to 1 minute for the scale to clear itself.
Scale is slow to return a weight after a baby is placed on the bed (that is, scale takes up to 40 seconds to return a weight).	Outdated software version of control board	<ol style="list-style-type: none"> 1. Turn on the bed. 2. Go to service mode. 3. Check the scale's software version in the bed's service screen. 4. If the scale version displayed is 3.xx, replace the control board with one whose software version is 4.xx.
Scale icon disappears/reappears on control panel. Scale makes repeated clicking noise.	Defective or disconnected cable	<ol style="list-style-type: none"> 1. Check that connector is fully inserted. 2. Check that scale connector is tightly assembled. Check for bent pins. 3. Check cable continuity. Repair or replace the cable.
	Defective printed circuit board	Replace the printed circuit board.
	Defective scale receptacle on unit	Replace the scale receptacle on the unit.

6.2.9 Electronics – SpO2

6.2.9.1 No SpO2 probe detected

Table 6-43 No SpO2 probe detected

Possible causes	Step	Troubleshooting procedure	Comments
Improper mating of probe with probe connector	1	Possible cause if SpO2 icon does not automatically appear when plugged in during power on.	
Dislodged SpO2 connector	2	Check that the probe connector at the probe panel (jack plate) is seated properly.	
	3	If the blue SpO2 connector has been dislodged from the probe plate, remove the bottom cover probe panel and snap the connector back into the connector plate.	
Reverse probe connection	4	Check that the instrument cable and contacts with the SpO2 disposable patient attachment probe are correctly inserted and are properly seated.	

Table 6-43 No SpO2 probe detected (Table continued)

Possible causes	Step	Troubleshooting procedure	Comments
Defective SpO2 flex circuit	5	Remove the bottom cover and verify that the SpO2 flex circuit is properly seated and connected.	See 7.9 Harness list on page 202 .
	6	Make sure the LED light is lit on the SpO2 probe. If not, replace the probe.	

6.2.9.2 No SpO2 option on screen

Table 6-44 No SpO2 option on screen

Possible causes	Step	Troubleshooting procedure	Comments
No communication between the SpO2 I/F PCA and control PCA	1	Check the rail harness connection J40 from the probe panel interface board to the SpO2 I/F PCA. Make sure harness is properly seated and correctly connected.	See 7.9 Harness list on page 202 .
	2	Verify the connection from the control PCA to the probe panel interface board. Make sure the harness is properly seated and the connections are correct.	See 7.9 Harness list on page 202 .
	3	If OK, remove the probe panel bottom cover.	
	4	Check the SpO2 rail harness connection at the SpO2 I/F PCA.	
	5	If OK, replace the SpO2 rail harness with a known good one from the probe panel interface board to the SpO2 I/F PCA.	
Defective SpO2 I/F PCA or control PCA	6	If OK, replace the control PCA or SpO2 I/F PCA.	

6.2.9.3 Oximetry system failure

Table 6-45 Oximetry system failure

Possible causes	Step	Troubleshooting procedure	Comments
Intermittent cables	1	Check the connection between the control PCA and probe panel interface board.	
	2	Check the connection between the SpO2 flex circuit and SpO2 I/F PCA.	See 7.9 Harness list on page 202 .

6.2.10 Electronics – elevating base (bedded only)

6.2.10.1 No motion

Table 6-46 No motion

Possible causes	Step	Troubleshooting procedure	Comments
Defective E-Base	1	Plug spare line cord directly into E-Base AC inlet. <ul style="list-style-type: none"> Green light ON indicates power to the E-Base. Test movement using foot switch pedals. 	
	2	If no movement: remove E-Base shroud; verify connectors from the foot switch pedals are properly seated and connected.	

Table 6-46 No motion (Table continued)

Possible causes	Step	Troubleshooting procedure	Comments
	3	If harness connections are OK and no movement from pedals on either side, then replace E-Base.	
No power to E-Base	4	With warmer powered, check for green light on column (located next to AC inlet connector). If not lit, continue.	
	5	Check settings in user menu. If the E-Base is disabled and user is unable to enable, check the service mode to ensure elevating base is enabled. Change to enable and save settings.	
	6	If enabled and there is still no power, verify that the E-Base power cord is connected properly to E-Base AC inlet.	
Blown fuse	7	Remove observation light transformer bracket on power PCA in order to check fuses.	
	8	Remove and check fuses F1, F4. Replace as necessary.	
Disconnected harness	9	Remove upper housing.	
	10	Check connector and terminals for AC harness at power PCA J28.	See 7.9 Harness list on page 202 .
Defective harness	11	Check in-line connectors and terminals.	See 7.9 Harness list on page 202 .
	12	Disconnect in-line connectors and check AC voltage on pins 1,3 of E-base harness at top of west rail.	
	13	Re-connect inline connectors and check AC voltage at E-base AC inlet connector.	
	14	Check E-Base fuse at the AC inlet connector. If OK, then is most likely a foot switch issue (skip to 6.2.10.2 Loss of up/down control from 1 foot switch on page 158).	
Defective power PCA	15	Check the voltage on power PCA at test point 26 from 2-1 and verify that it is greater than 2V (by probing back of connector). If OK, verify mains voltage is present at power PCA connector J28 pins 3-6. If not, replace the defective power PCA.	
Defective control PCA	16	While in service mode, check the voltage on power PCA at test point 26 from 2-1 and verify that it is greater than 2V (by probing back of connector) to verify that the enable/disable control and listen for the relay click. If tests fail, check/replace 20 pin ribbon cable connected to the power PCA at J23. Otherwise, replace the control PCA.	See 7.9 Harness list on page 202 .

6.2.10.2 Loss of up/down control from 1 foot switch

Table 6-47 Loss of up/down control from 1 foot switch

Possible causes	Step	Troubleshooting procedure
Defective foot switch	1	Remove E-Base shroud. Verify connectors from the foot switch pedals. If all is OK, replace defective foot switch.

6.2.11 Electronics – heat control

6.2.11.1 Heat engine failure

Table 6-48 Heat engine failure

Possible causes	Step	Troubleshooting procedure
No signal from heat control processor	1	Refer to 6.2.5.13 Sys Fail 11 [AA AA AA AA] on page 150 for information.

6.2.12 Electronics – power failure

6.2.12.1 Device will not turn on (power fail alarm)

Table 6-49 Device will not turn on (power fail alarm)

Possible causes	Step	Troubleshooting procedure	Comments
No 12V DC power supply	1	Remove the rear cover. Using a DC volt meter, check the voltage from chassis to the top of fuse, F7, on the power PCA. If 12V is present, skip to Step 5 on page 159 . Otherwise, continue.	
	2	Check the connection from the power supply to the power PCA (J20). Make sure the connector and pins are properly seated.	
	3	If OK, remove the connector, J20, on the power PCA. Using a DC volt meter, check for 12V at pins 1,5 on the cable side.	
	4	If there is still no DC, skip to Step 8 on page 159 .	
Blown fuse on power PCA	5	Using a DC volt meter, check the voltage from chassis to the bottom side of fuses F7 (12V) and F8 (3.5V). If there is no voltage, continue with steps, to find/correct the short before replacing the fuse(s).	
	6	Disconnect J22 on the power PCA. Test for power-to-ground short on the control PCA by probing the harness connector: pin 1, 2 (BLK) ground; pin 3 (RED) 3.5V; pin 4 (ORN) 12V.	See 7.9 Harness list on page 202 .
	7	Isolate location of short: Disconnect the ribbon cable from the control PCA to the alarm/light PCA; Disconnect the flat flex cable from the control PCA to the LCD module. Replace the PCA or module that contains the short.	
No AC voltage to power PCA	8	*Assuming that the device is plugged into the wall and the rear main switch is turned On* Turn on the front panel switch. Disconnect J28 from the power PCA and test at pins 2,5 (center pins). If there is no AC voltage, continue with steps. If OK, then proceed to Step 10 on page 159 .	
	9	Test fuses F2,F5. In addition, check the contacts on the warmer head harness. Replace/repair as necessary.	See 7.9 Harness list on page 202 .
	10	If OK, reattach J28. There is AC voltage coming off of the power PCA but no DC being transferred back.	
	11	Otherwise, there is no AC voltage coming off of the power PCA. Proceed with the following steps.	

Table 6-49 Device will not turn on (power fail alarm) (Table continued)

Possible causes	Step	Troubleshooting procedure	Comments
	12	Disconnect connector at J27 on the power PCA. Check for AC power at pins 3,5. Also, test the front panel switch (power standby switch) using an Ohm meter at pins 1,2. Off= Open, On= Short. If Open, there is no AC voltage to the power PCA, then the front panel switch is defective.	
	13	If no power, troubleshoot the line filter harness from the AC inlet through the main circuit breaker, through the line filter, through to the J27 connection to find the open in the circuitry.	

6.2.13 Mechanical (bedded only)

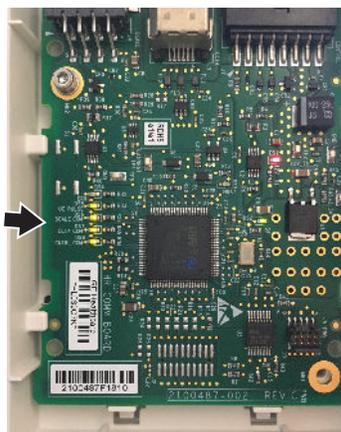
6.2.13.1 Bed does not tilt

Table 6-50 Bed does not tilt

Possible causes	Step	Troubleshooting procedure
Disconnected control cable	1	Check that the cable terminators are fully seated in retainers.
Bed lock malfunctioning	2	Isolate primary and secondary lock by disconnecting 1 then the other from the main brackets and then tilting the bed. Replace defective lock as necessary.

6.2.14 ResusView™ Heart Rate (HR) option (Panda iRes bedded only)

6.2.14.1 HR interface board LED message descriptions

Figure 6-1 LED messages on HR interface board**Table 6-51 HR interface board LED message descriptions**

This LED message ...	Is illuminated when ...
uC PULSE	The microcontroller is running. The standard behavior is flashing. Any other state indicates an HR interface board issue.

Table 6-51 HR interface board LED message descriptions (Table continued)

This LED message ...	Is illuminated when ...
ERR	An unrecoverable hardware error occurs. The standard behavior is off.
SCALE COM	Communication with the scale is active. The standard behavior is on.
CNTRL COM	Communication with the Main Application (MAP) is active. The Main Application runs on the control board. The standard behavior is on.
CC14 COM	Communication with the ECG capture device (CC14) is active. The standard behavior is on, once Admit Baby is pressed.

6.2.14.2 Troubleshooting symptoms and fault codes

Table 6-52 Troubleshooting symptoms and fault codes

Symptom	Possible causes	Actions
HR missing and scale active since start up	There is a working or partially working HR interface board without an active connection to the CC14. The active scale proves that the HR interface board is active and is relaying scale packets.	<ol style="list-style-type: none"> 1. Confirm that the CC14 is powered on (has active LEDs). If it is not powered on, replace the CC14 and the cable. 2. Confirm that the ECG COM LED and MAP COM LED are on. If they are not on, replace the carrier board.
HR missing and scale missing since start up	Either the HR interface board is not active, or both the scale and the ECG acquisition board are not functioning. If no HR System Failure alarm is active, either the CC14 or the carrier board has not been functioning since start up.	<p>Check the HR interface board for the flashing uC Pulse LED.</p> <p>If uC Pulse is flashing:</p> <ol style="list-style-type: none"> 1. Check CC14 and scale connections. 2. If connections are good, confirm that the CC14 and scale are powered on. <p>If uC Pulse is not active:</p> <ol style="list-style-type: none"> 1. Check the rail cable, then replace the carrier board. 2. After replacing the carrier board, confirm that the SCALE COM, ECG COM, MAP COM, and uC Pulse LEDs are exhibiting expected behavior.
HR subsystem failure and scale active	There is a working or partially working HR interface board without an active connection to the CC14. The active scale proves that the carrier board is active and is relaying scale packets.	<ol style="list-style-type: none"> 1. Confirm that the CC14 is powered on (has active LEDs). If it is not powered on, replace the CC14 and the cable. 2. Confirm ECG COM LED is on. If it is not on, replace the HR interface board.

Table 6-52 Troubleshooting symptoms and fault codes (Table continued)

Symptom	Possible causes	Actions
HR subsystem failure and scale missing	Either the carrier board is not active, or both the scale and the CC14 are not functioning. If no HR Subsystem Failure alarm is active, the carrier board was active at 1 point and communicating with the CC14.	<p>Check the carrier board for the flashing uC Pulse LED.</p> <p>If uC Pulse is flashing:</p> <ol style="list-style-type: none"> 1. Check the CC14 and scale connections. 2. If connections are good, confirm that the CC14 and scale are powered on. 3. If ECG COM LED exhibits expected behavior, do not replace CC14. 4. If scale LED does not exhibit expected behavior, replace scale. <p>If uC Pulse is not active:</p> <ol style="list-style-type: none"> 1. Check the rail cable, then replace the carrier board. 2. After replacing the carrier board, confirm that the scale, ECG COM, and uC Pulse LEDs are exhibiting expected behavior.
Lead off	The carrier board and ECG acquisition board are active and communicating, but the CC14 is reporting a lead off.	<ol style="list-style-type: none"> 1. Confirm that the leads are properly attached to the patient. 2. Confirm that the leads are properly attached to the trunk cable. 3. Confirm that the trunk cable is properly attached to the green multilink connector. 4. Check whether the green multilink connector is internally connected to the correct ports on the CC14 (LL, LA, RA). 5. If CC14 is damaged, replace it.
HR active and scale missing	Either a carrier board partially failed or a scale failed.	<ol style="list-style-type: none"> 1. Check the scale cable. 2. Replace the scale, and check for the scale LED on the carrier board. 3. If the scale LED is off, replace the carrier board.

6.3 Troubleshooting application software 1.0.9 and earlier

6.3.1 Service mode

To access the main service mode, turn on the device and hold **Help (?)** and **Alarm Silence** for approximately 10 seconds after you see the Giraffe/Panda logo screen. From the main menu, select keys for user settings, unit specific information, calibration, time settings, and diagnostics. Refer to [Figure 6-2 Main service menu on page 163](#). To exit the service mode, power down the device.

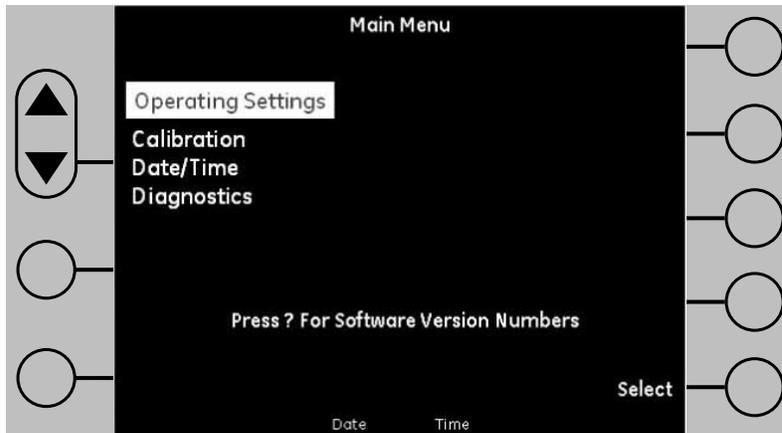
If the device will not boot up, the service mode can be accessed by setting control board dipswitch position 1 to ON and turning on mains power. The default position of all 8 dipswitch positions is OFF.

To access the unit specific information, push **Help (?)** while in the service mode.

6.3.1.1 Unit-specific information

To access the unit information, push **Help** (?) while in the service mode.

Figure 6-2 Main service menu



Unit information displays

- Unit type
- Software
- Processor and option versions
- PC board ID's
- Battery voltage status
- Power fail minutes
- Language

6.3.1.2 Operator settings

Operator settings enable users to customize the behavior of alarms, user functions, and displayed units by setting default values for the parameters and options listed in the following table.

Table 6-53 Operator settings

Parameter/Option	Settings	Default
Patient temp alarm	0.5°C / 1.0°C	1.0°C
CPAD (check patient alarm disabled)	5% to 50%	25%
Man temp alarm	Off / 0.5°C / 1.0°C	Off
Touchless silence	Enable / Disable	Enable
Bed elevate (for bedded warmers with elevating base)	Enable / Disable / Disengaged	Enable
Bed elevate (for bedded warmers with fixed-adjustable base, freestanding warmers, and wall mount warmers)	Enable / Disable / Disengaged	Disengaged
Temp Units	°C / °F	°C
Scale Units	grams / lbs-oz	grams

Table 6-53 Operator settings (Table continued)

Parameter/Option	Settings	Default
Scale Resolution	10 / 5 grams	10 grams
Time Format	12 / 24	24
Low pulse limit	0 to 110	100
High pulse limit	111 to 240	200
Low sat limit	0 to 99	85
High sat limit	86 to 105	100
Masimo SpO2 averaging	2-4 / 8 / 16	8
Masimo SpO2 sensitivity	Normal / Maximum	Normal
Nellcor SpO2 Response Mode	Normal / Fast	Normal
Nellcor SpO2 Display	Pleth / Blip	Pleth
Pulse tone volume, Panda device	0 / 1 / 2 / 3 / 4	1
Pulse tone volume, Giraffe device	0 / 1 / 2 / 3 / 4	0
Alarm volume	1 / 2 / 3 / 4	4
Language	Many	English

6.3.1.3 Calibration

Allows the user to calibrate the scale either using a known weight which is configurable or by resetting it to factory calibration.

6.3.1.3.1 Date/Time

Allows the user to set the device displayed month, year, day, hour, and minute.

6.3.1.3.2 Diagnostics

The diagnostic utilities are used to determine the overall health of the system from an electronic and software standpoint. Available utilities are as follows:

- **ADC channels:** The ADC utility provides the means to display A to D values for the patient probe thermistors, fixed reference A to D input, control board temperature (ambient temperature) as well as A to D reference voltage.
- **VGA test:** The VGA test utility instructs the display processor to display a color test pattern of all black, red, green, blue and gray. Once invoked, each pattern is stepped through by pushing the up or down keys on the touch panel.
- **Touch panel:** The touch panel utility is an interactive utility which displays the real time status of the touch panel buttons.
- **Scale A/D values:** The scale A/D values utility displays the raw counts and corrected values based on calibration and used by the software to calculate the displayed value.
- **Audio test:** The audio test utility allows the user to invoke the alarms and pulse tone.
- **Odometer:** The odometer utility displays minutes of operation in both a re-settable and nonre-settable format, as well as minutes of operation at 10 to 100% power output in 10% increments.
- **Logs:** The logs utility displays system fail messages which are stored in a first in, first out format and is limited in size.

- Heat engine check: When the heat engine health check diagnostic is started, the main processor sends a command to the heat control processor to set the output to 25%. The measured output is then monitored and displayed. Stop sets the output to 0%. The acceptable output is between 24 and 26 percent. Commands: Start; Stop; Exit.

6.3.1.4 Diagnostics using serial port

Tools required

Terminal emulator program capable of XMODEM transfers

Null modem cable

Using a PC and null modem cable gives access to an additional diagnostic screen that allows you to update system software, access logs, and perform other commands not available on the device's service mode screen.

1. Connect the cable to the 9-pin serial port located on the back of the device to a Windows-based PC.
2. Open the terminal emulator program.
3. Connect using the COM port number enumerated in your system – for example, COM 5.
4. Set the connection to the following settings:
 - In Baud rate, enter **115200**.
 - In Data bits, enter **8**.
 - In Parity, enter **None**.
 - In Stop bits, enter **1**.
 - In Flow control, enter **None**.
5. Boot the device into service mode software if it is not already.
6. Press **Enter**.
7. Type **help** and press **Enter** to see available commands.

The **logs** command will display log types using the following parameters: POW_UP, BUT_PUSH, ALARM, SILENCE, SYSFAIL, STATE, CF.

Typing **logs** will capture all data. Data transfer may take up to 15 minutes.

6.3.1.5 File capture

Tools required

Terminal emulator program capable of XMODEM transfers

Null modem cable

1. To capture a log file, see [5.2.4 Engineering log dump on page 134](#).

Data received via the **logs** command will contain multiple entries formatted in the following fashion:

The first 4 sections (Date, Time, Temperature, Log Type) are consistent for every entry and have the following values:

Date	The Date the log entry occurred
------	---------------------------------

Time	The Time the log entry occurred	
Temperature	A reading of a thermistor placed on the surface of the control board	
Log Type	Can be 1 of the following values:	
	POW_UP	Denotes a log entry indicating the system was powered up
	BUT_PUSH	Captured information about a button being pushed or released
	ALARM	Captured information about an alarm occurring
	SILENCE	Captured information about an alarm being silenced
	SYSFAIL	Captured information about a system failure
	STATE	Captured information about the general state of the system
	CFG	Captured information about the configuration settings
	SPO2SET	Captured information about the SpO2 settings

Auxiliary data consists of 10 data bytes represented in hexadecimal format. These data bytes have different meanings depending on the log type, as defined below. If the data byte is not listed, the associated value is meaningless.

“POW_UP”	Auxiliary data has no meaning.
“BUT_PUSH”	Byte 0 – Is a unique identification for each button on the system. Byte 1 – 1 if the button was pushed. 0 if the button was released.
“ALARM”	Byte 0 – Indicates the alarm that has occurred. This byte can be cross-referenced to alarm priorities by adding 1. If Byte 0 = 9 then this indicates Alarm 10 on the table Temp. Probe Failure. Byte 1 – The stage of the alarm. A “1” indicates the alarm has just occurred. A “2” indicates the alarm has progressed because the alarm condition has not been alleviated or the alarm has not been silenced.
“SILENCE”	Byte 0 – Indicates the alarm that has been silenced. This byte can be cross-referenced to alarm priorities by adding 1. If Byte 0 = 9 then this indicates Alarm 10 on the table Temp. Probe Failure. Byte 1 – The stage of the alarm. A “1” indicates the alarm has just occurred. A “2” indicates the alarm has progressed because the alarm condition has not been alleviated or the alarm has not been silenced.
“SYSFAIL”	Bytes 0-3 – The auxiliary data associated with the system failure Byte 4 – The system failure number which corresponds to the values found in the tables in 6.2.5 System failure – Sys Fail message on page 145 .

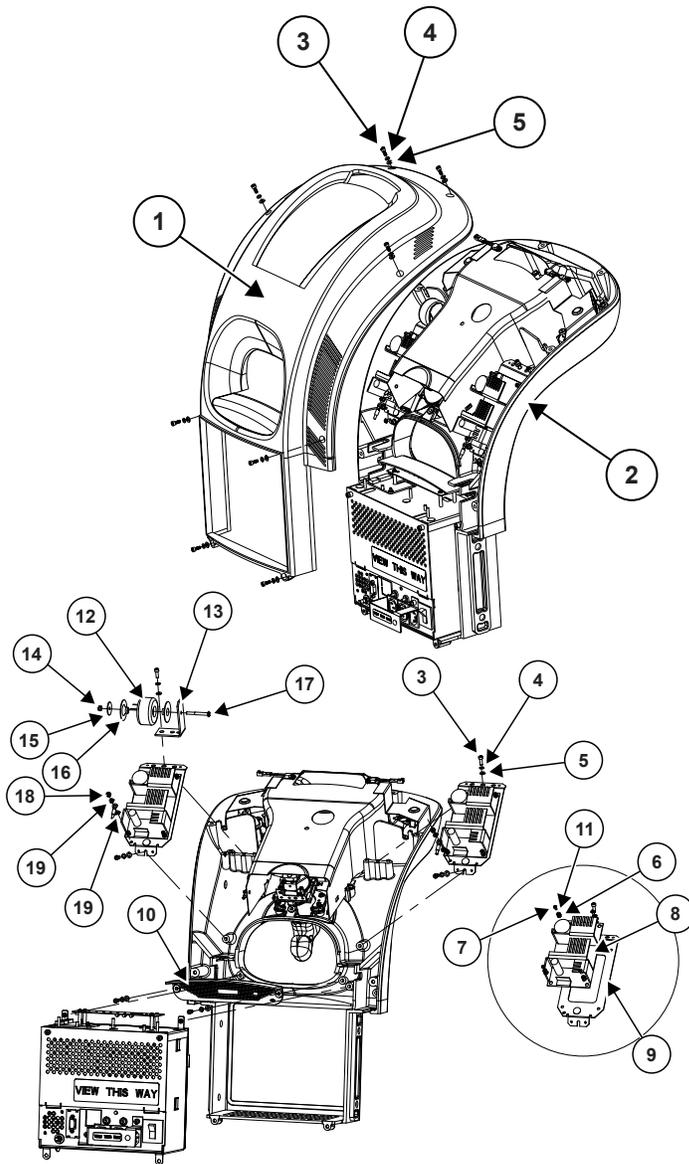
“STATE”	<p>Bytes 0-3 – The patient set point listed in hexadecimal byte-swapped format</p> <p>NOTE</p> <p>No decimal place is present (6d 01 00 00 can be looked at as 0x0000016d which translates to 365 or 36.5°C).</p> <p>Byte 4 – Is used internally to determine what menu is on the screen.</p> <p>Byte 5 – Is an indication of the mode.</p> <ul style="list-style-type: none"> • “0x11” for Manual Mode • “0x12” for Baby Mode • “0x13” for Preheat Mode <p>Byte 6 – Is an indication of the SpO2 State.</p> <ul style="list-style-type: none"> • “0” is not present. • “1” is present, but never attached to a patient. • “2” is no probe connected. • “3” is running. • “4” is stopped. • “5” is out of service. <p>Byte 7 – Is a hexadecimal indication of the percent power (from 0% to 100%).</p>
“CFG”	<p>Byte 0 – Temp Units (0 for Centigrade, 1 for Fahrenheit)</p> <p>Byte 1 – Alarm Volume</p> <p>Byte 2 – Elevating Base (0 for disabled, 1 for enabled)</p> <p>Byte 3 – Hands Free Silence (0 for disabled, 1 for enabled)</p> <p>Byte 4 – Patient Temp Alarm Setting</p> <p>Byte 5 – Manual Temp Alarm Setting</p>
“SPO2SET”	<p>With Masimo SpO2 installed:</p> <p>Byte 0 – The Pulse Tone Volume</p> <p>Byte 1 – Averaging (0x0 for “2-4”, 0x02 for “8”, and 0x06 for “16”)</p> <p>Byte 2 – Sensitivity (0x0 for Maximum, 0x01 for Normal)</p> <p>Byte 3 – Low Pulse Rate Limit Setting</p> <p>Byte 4 – High Pulse Rate Limit Setting</p> <p>Byte 5 – Low Saturation Limit Setting</p> <p>Byte 6 – High Saturation Limit Setting</p> <p>With Nellcor SpO2 installed:</p> <p>Byte 0 – The Pulse Tone Volume</p> <p>Byte 1 – Response Mode (0x01 for Normal, 0x02 for Fast)</p> <p>Byte 2 – SatSeconds™ Limit Setting</p> <p>Byte 3 – Low Pulse Rate Limit Setting</p> <p>Byte 4 – High Pulse Rate Limit Setting</p> <p>Byte 5 – Low Saturation Limit Setting</p> <p>Byte 6 – High Saturation Limit Setting</p>

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Chapter 7 Parts

7.1 Heater housing

Figure 7-1 Heater housing



Callout	Part	Part number
1	Heater head upper housing	6600-2034-500
2	Heater head lower housing - Requires Branding Label Set. Choose 1: <ul style="list-style-type: none"> • Label Set Giraffe Branding • Label Set Panda Branding 	M1092513 <ul style="list-style-type: none"> • M1111366 • M1111360

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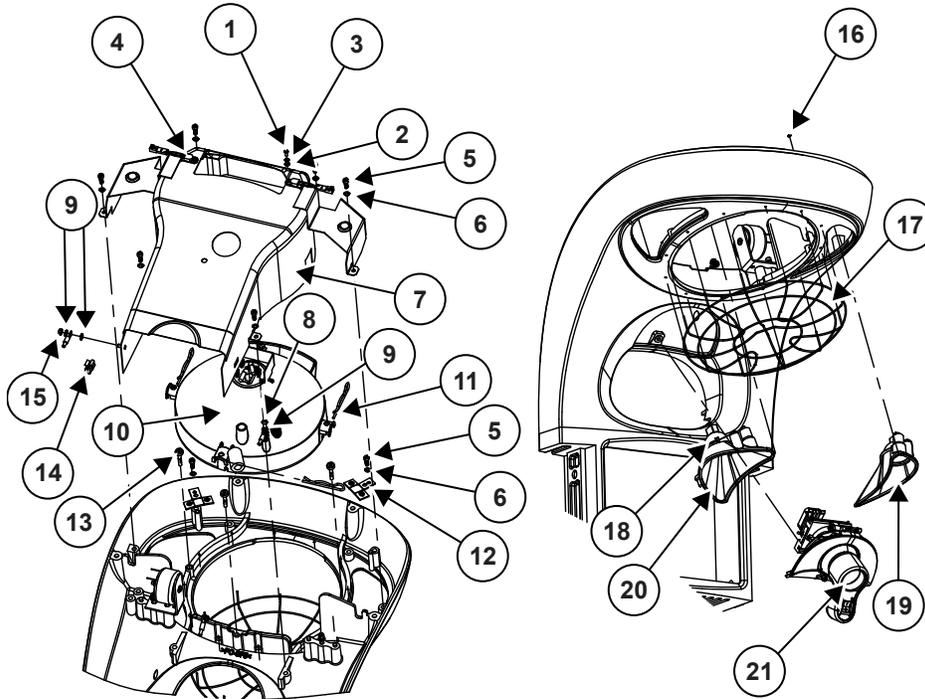
Callout	Part	Part number
3	Screw, M4 X 12, Skt Hd	6600-0707-410
4	Split ring washer, M4 X 4.1ID, 0.9	6600-0713-403
5	Washer, M4 X 4.3 ID, 0.8	6600-0712-403
6	Washer, M3 X 3.2 ID, 0.5	6600-0712-402
7	Screw, M3 x 8, Btn Hd	6600-0706-405
8	Power Supply 12V 65W	2075961-001
9	Power Supply brkt	6600-2097-500
10	Alarm light lens ^{*1} Indicator light lens ^{*2}	6600-2043-500 2074821-001
11	Spit ring washer, M3	6600-0713-402
12	Harness Power Factor Correction	M1113026
13	Inductor mounting bracket	M1114499
14	Lock nut	6600-0714-402
15	Washer, M4	0402-1133-300
16	Toroid mtg, washer, 0.175ID x 0.875OD	M1114284
17	Screw, M4 x 40 Btn. Hd ^{*3}	6600-0706-416
18	Nut, M4	6600-0711-407
19	Lockwasher, M4 Int. Tooth	6600-0713-432

*1 Found in non-IEC compliant devices

*2 Found in IEC compliant devices

*3 Install heat shrink tubing on screw shaft.

Figure 7-2 Heater engine



Callout	Part	Part number
1	Screw, M3 x 8, Btn Hd	6600-0706-405
2	Washer, M3 X 3.2 ID, 0.5	6600-0712-402
3	Split ring washer, M3	6600-0713-402
4	Thermostat	M1074875
5	Screw, M4 X 12, Skt Hd	6600-0707-410
6	Split ring washer, M4 X 4.1ID, 0.9	6600-0713-403
7	Heater duct	6600-2037-500
8	Screw, M4 X 10 Btn Hd	6600-0706-409
9	Lock washer, M4 Int Tooth	6600-0713-432
10	Heat engine kit 115V Heat engine kit 230V	M1110787-S M1110788-S
11	Dish retaining pin	6600-2096-500
12	Observation Light Brkt	6600-2142-500
13	Screw, alignment	6600-2101-500
14	Cable clip	M1085398
15	Nut, M4 X 0.7	6600-0711-407
16	Push-on clip, grill retainer	M1079756
17	Protective grill (order 12 pcs. item 16)	6600-2032-500
18	Observation light, bulb replacement	M1121134
19	Observation light kit, right	M1108233-S
20	Observation light kit, left	M1108234-S

Callout	Part	Part number
21	Procedure light kit	M1092567

Procedure light bulb

- Replacement: M1121135
- Procedure light mounting screw retainer: 6600-1296-400

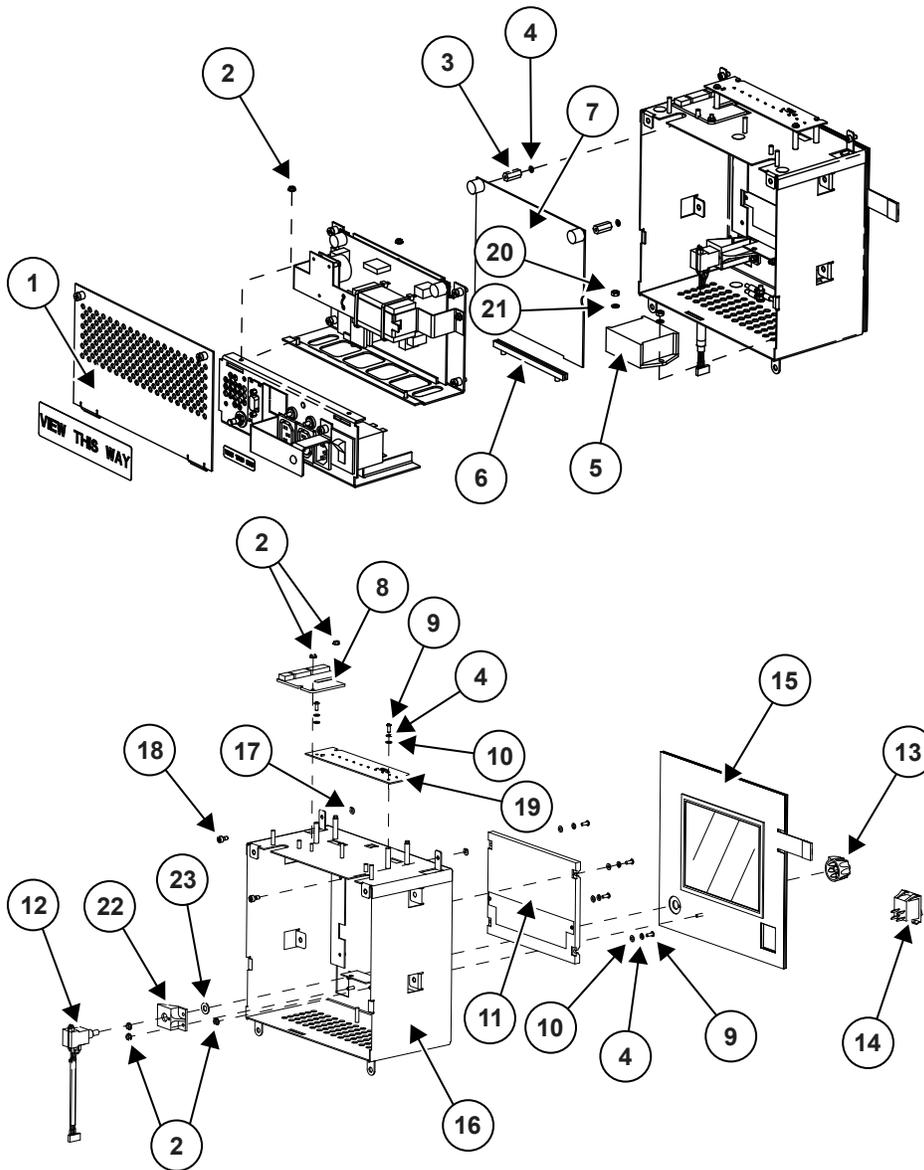
Parts not shown

Procedure light filler plate and mounting hardware for devices without option:

- Filler plate mounting screw, M4 x 20 Btn Hd: 6600-0706-412
- Split ring lock washer, M4: 6600-0713-403
- Washer, M4: 6600-0712-403

7.2 Electronics enclosure

Figure 7-3 Electronics enclosure



Call out	Part	Part number
1	Rear enclosure cover (includes labels)	M1118330
2	Keps nut, M3	M1074118
3	Standoff, M3 8 x 18	M1076053
4	Split ring washer, M3 X 3.1ID, 0.8	6600-0713-402
5	Line filter	M1107967
6	Card guide, 4.5	M1079766

Continues on the next page

Call out	Part	Part number
7	Control board	See Table 7-1 LED IEC alarm parts upgrade matrix on page 174.
	Lithium ion battery ^{*1}	M1121133
8	Probe panel interface board	2065772-001
9	Screw M3 X 8 Btn Hd	6600-0706-405
10	Washer, M3 X 3.2 ID, 0.5	6600-0712-402
11	LCD Display	See Table 7-1 LED IEC alarm parts upgrade matrix on page 174.
12	Wire harness warmer observation light switch ^{*2}	6600-1588-700
13	Observation light knob ^{*2}	2076390-001
14	Power standby switch	6600-1356-600
15	Touch panel (For devices with SpO2, order logo label indicated in 7.13 Labels on page 216.)	M1118319
16	Electronics enclosure	M1109562
17	Split ring retainer	6600-1296-400
18	Screw, M4 X 8 captive	6600-0868-401
19	Alarm Light Board ^{*3}	2074881-001
	Indicator Light Board ^{*4}	2076180-001
20	Nut, M4 X 0.7	6600-0711-407
21	Split ring washer M4 x 4.1, 0.9	6600-0713-403
22	Potentiometer mount ^{*2}	M1129877
23	Washer, plastic ^{*2}	M1129879

*1 Battery must have heat shrink around it to avoid damage.

*2 If the wire harness warmer observation light switch has a metal shaft, you will need to order all 4 items: 12, 13, 22, and 23.

*3 Found in non-IEC compliant devices

*4 Found in IEC compliant devices

Table 7-1 LED IEC alarm parts upgrade matrix

Failed part			Required replacement	
Part number (PCA/display)	Revision	Description	Service kit part number	Description
M1087687	Any	PCA Warmer Control	2090845-001	IEC Alarms Upgrade Kit - With CD
			2090844-001	IEC Alarms Upgrade Kit - With Control Board
2065760-001	A - H	Control Board RoHS, Warmer	2090845-001	IEC Alarms Upgrade Kit - With CD

Table 7-1 LED IEC alarm parts upgrade matrix (Table continued)

Failed part			Required replacement	
Part number (PCA/display)	Revision	Description	Service kit part number	Description
			2090844-001	IEC Alarms Upgrade Kit - With Control Board
2065760-001	J - L	Control Board RoHS, Warmer	2092027-001	Warmer Control Board Kit: IEC Alarms Software
2096185-001	Any	Control Board RoHS, Warmer, LED backlit display	2096186-001	Warmer Control Board Kit: LED backlit display
T-51750GD065J-FW-AJN		LCD Display	2096917-001	ASSY-LAU, Service Kit Display, Kyocera 6.50 LED Upgrade
T-51750GD065J-LW-AYN		Display Kyocera 6.50, LED Backlit	2096187-001	ASSY-LAU, Service Kit Display, OPITREX 6.50 LED, Spare Part

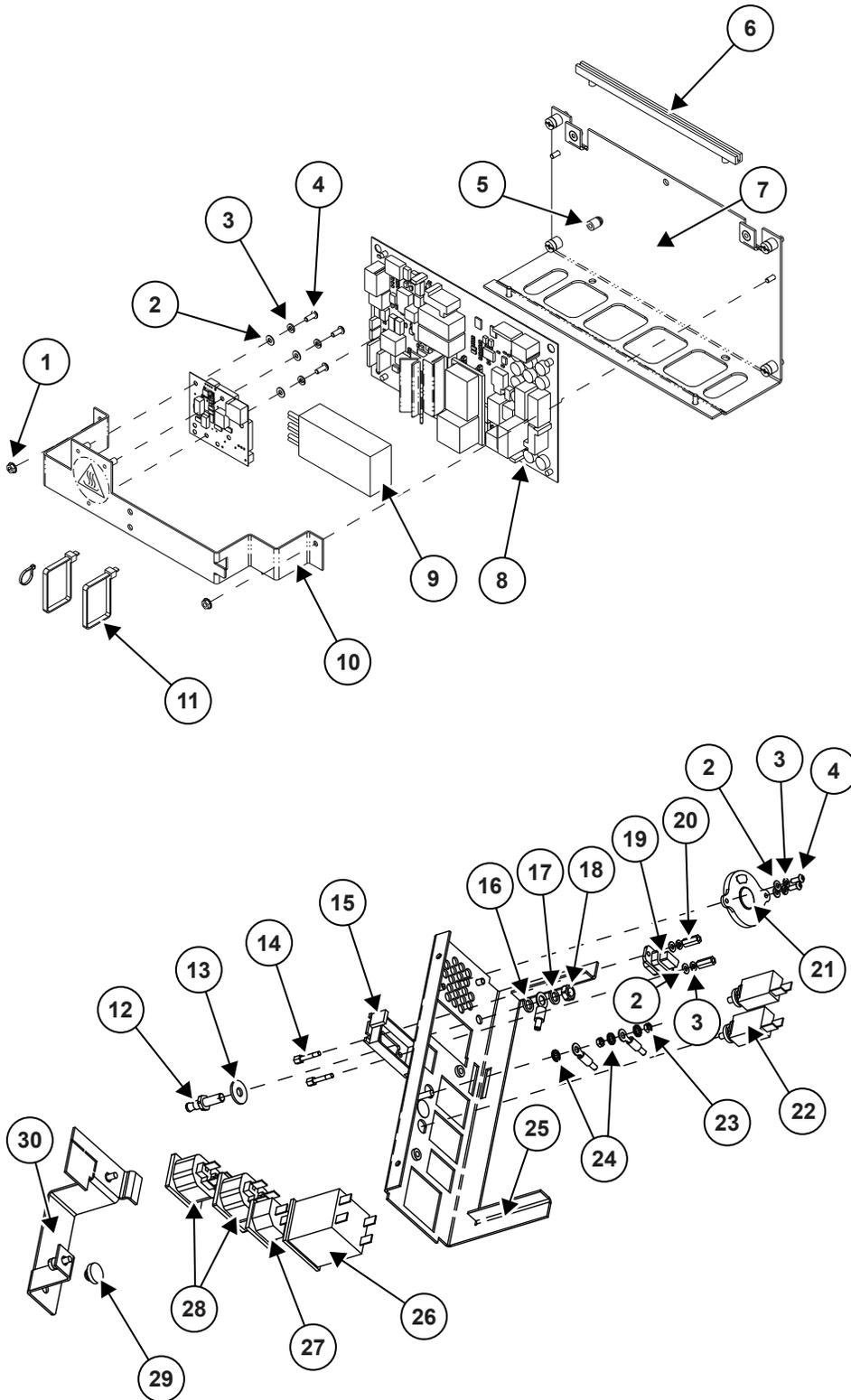
Table 7-2 FRU kit for 115V transformer

Failed part		Required replacement	
Part number	Description	Service kit	Description
2065752-001	Halogen transformer, 115V	5514157	FRU KIT, HALOGEN TRANSFORMER 115V, WARMER
		5514159	FRU Kit, HARNESS OBS LIGHT DIMMER, SWITCH, 115V WARMER
6600-1588-700	Wire Harness Warmer OBS Light SW, ROHS	5514157	FRU KIT, HALOGEN TRANSFORMER 115V, WARMER
		5514159	FRU Kit, HARNESS OBS LIGHT DIMMER, SWITCH, 115V WARMER

Table 7-3 FRU kit for 230V transformer

Failed part		Required replacement	
Part number	Description	Service kit	Description
2065756-001	HARNESS ELECTRONIC TRANSFORMER 230V ROHS, WARMER	5697612	FRU KIT, HALOGEN TRANSFORMER 230V, WARMER
		5514159	FRU Kit, HARNESS OBS LIGHT DIMMER, SWITCH, 115V WARMER
6600-1588-700	Wire Harness Warmer OBS Light SW, ROHS	5697612	FRU KIT, HALOGEN TRANSFORMER 230V, WARMER
		5514159	FRU Kit, HARNESS OBS LIGHT DIMMER, SWITCH, 115V WARMER

Figure 7-4 Power board and outlet panel



Call out	Part	Part number
1	KEPS nut, M3	M1074118
2	Washer, M3 X 3.2 ID, 0.5	6600-0712-402

Continues on the next page

Call out	Part	Part number
3	Split ring washer, M3 X 3.1ID, 0.8	6600-0713-402
4	Screw M3 X 8 Btn Hd	6600-0706-405
5	Spacer, stacking	M1083992
6	Card guide, 6	M1079769
7	Power brd panel	M1109625
8	Power board	2080440-001
	Fuse kit*1	M1118329
9	FRU KIT, HALOGEN TRANSFORMER 115V, WARMER	5514157
	Halogen transformer, 230V	5896790
	FRU KIT, HALOGEN TRANSFORMER 230V, WARMER	5697612
10	Halogen transformer mntg brkt	M1073739
11	Cable tie	6600-0364-400
12	Ground Potential post	6600-0337-400
13	Color label, Pot EqI	6600-0338-400
14	Screw 4-40x.625	6600-1289-400
15	RS-232 Isolation plate	6600-0940-400
16	Lock washer, M6 X 6.4ID, 0.7 Ext th	6600-0713-445
17	Lock washer, 6.5MM Pot EqI	6600-0339-400
18	Nut, M6 Ptl EqI	6600-0340-400
19	RS-232 wire harness	6600-1564-700
20	Standoff 3/16 hex .5L 4-40 FF	6600-1286-400
21	Alarm speaker	6600-1563-700
22	Circuit breaker 3.5 AMP	6600-0562-603
23	Nut, M4 X 0.7	6600-0711-407
24	Lock washer, M4 X 4.3ID, 0.5 Int Tooth	6600-0713-432
25	Outlet panel	6600-2154-500
26	Mains switch 230V 9A	6600-1014-601
	Mains switch 115V 12A	6600-1014-602
27	Connector, IEC320-C14 inlet, snap in	M1100425
28	Connector, Outlet, snap-in	6600-0583-600
29	Rubber Bumper 1/4 inch (used with Volex and Feller brand cords)	M1128306
	Hood Cover Button	6600-1788-500
	M5 ft washer	6600-0712-404
	M5 X10 btn hd scr (115V, 60HZ devices, when used SUN FAI brand cord)	6600-0706-417
	Rubber bumper 1/8 inch (All other devices, including ICS, Interpower, and Electri-Cord)	6600-1161-400
30	Power cord retainer (includes label)	M1118359

*1 Includes 10 pieces 3.15 A, 10 pieces 2A, 5 pieces 6.3A, and 5 pieces NANO2 2A

To identify a particular cord brand, look for the name or trademark logo stamped into the plug and/or the connector.

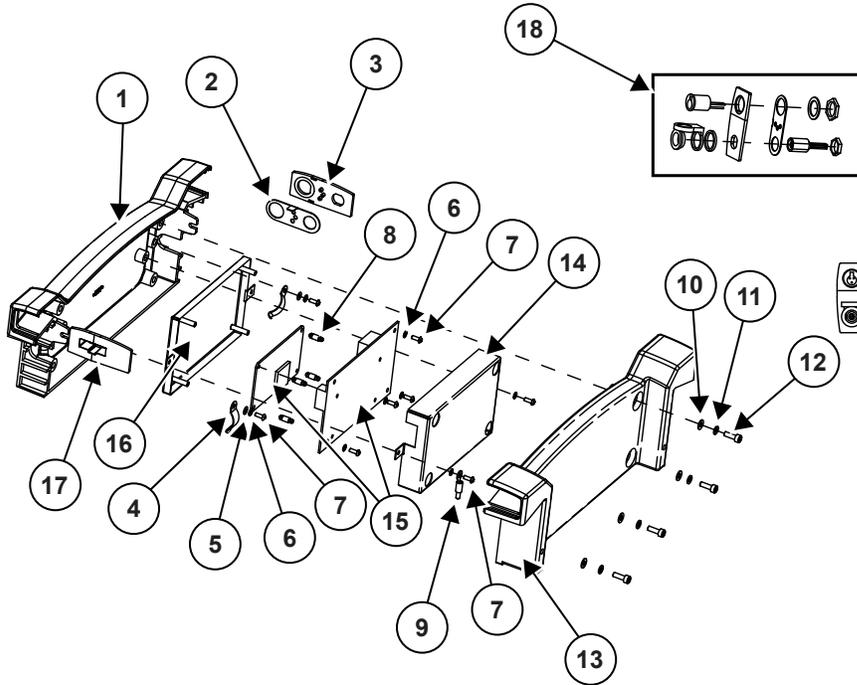
7.3 Probe panel housing

7.3.1 Probe panel housing with Masimo SET 1 SpO2 jack

NOTE

Several of the parts below are not orderable and are provided for reference only.

Figure 7-5 Probe panel housing with Masimo SET 1 SpO2 jack



Call out	Part	Part number
1	Probe panel housing top (for devices with the SpO2 option, includes SpO2 logo label)	M1092523
2	Jack ground plate	6600-2134-500
3	Jack plate, Scale/ Pat. probe Jack Plate (Freestanding and Wall Mount)	6600-2127-500 6600-2129-500
4	Tension clip	M1110360
5	Washer, M3 X 3.2 ID 0.5	6600-0712-402
6	Split ring washer M3 X 3.1 ID 0.8	6600-0713-402
7	Screw, M3 x 8 Btn Hd, SpO2 ground	6600-0706-405
8	Support post, SpO2 only	M1080260
9	Star washer, M3 x 3.2 ID 0.4 Int	6600-0713-431
10	Washer, M4 x 4.3 ID 0.8	6600-0712-403
11	Split ring washer M4 x 4.1, 0.9	6600-0713-403
12	Screw, M4 X 12 Skt Hd	6600-0707-410
13	Probe panel housing bottom	6600-2124-500
14	SpO2 Shield, bottom	M1104635
15	SpO2 interface board/Masimo SET 1 PCB	M1092344*1
16	SpO2 Shield, top	M1104615
17	Jack plate, SpO2 Jack plate, blank	6600-2128-500 6600-2126-500

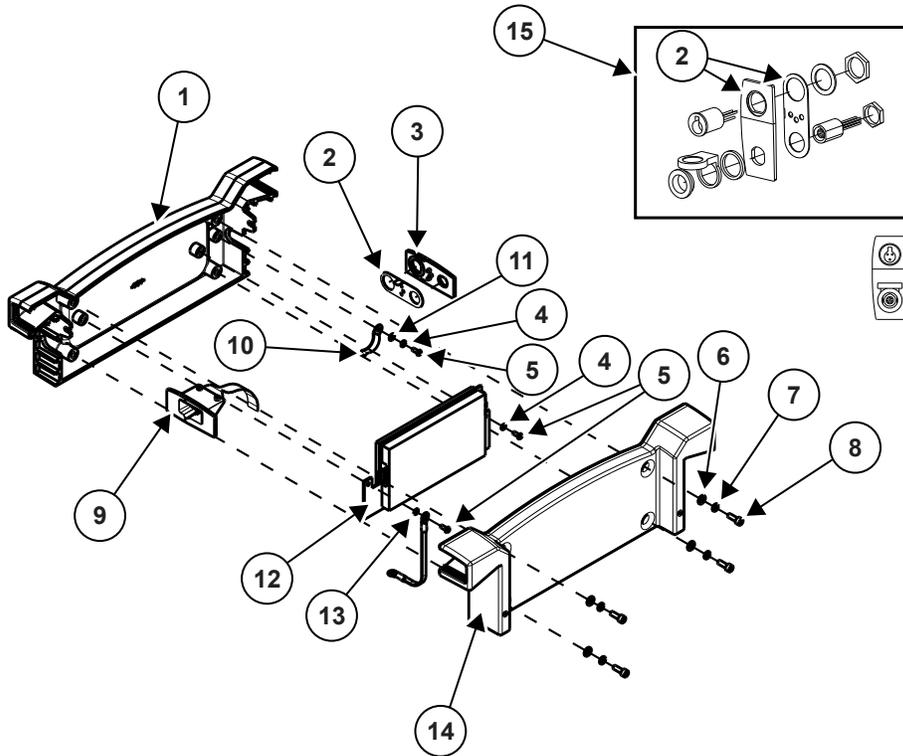
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Call out	Part	Part number
18	The parts are included in harness assemblies.	See 7.9 Harness list on page 202 .

*1 SpO2 interface and MASIMO SET 1 PCB are sold as a matched pair.

7.3.2 Probe panel housing with Masimo SET 2 or Nellcor SpO2 jack

Figure 7-6 Probe panel housing with Masimo SET 2 or Nellcor SpO2 jack

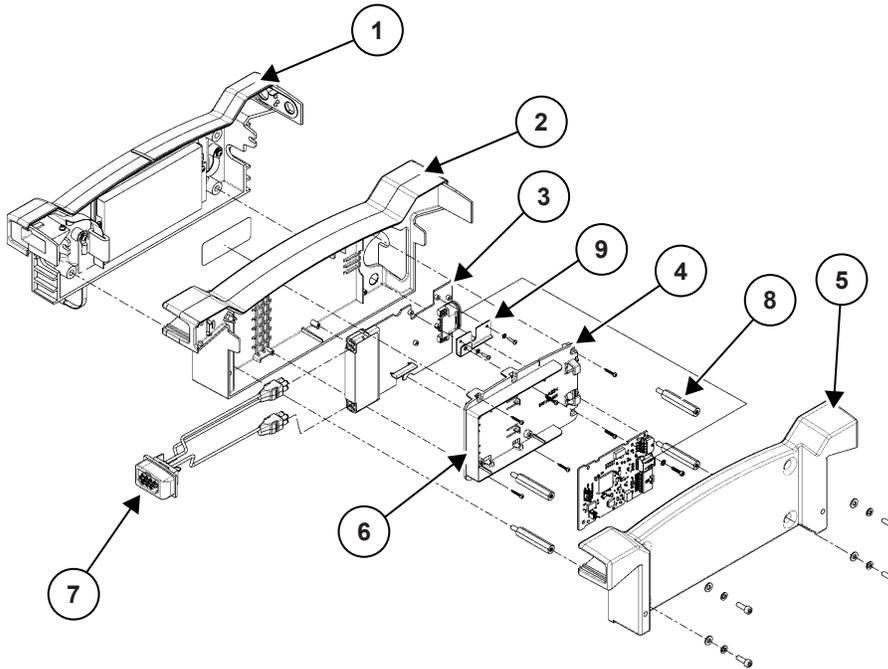


Callout	Part	Part number
1	Probe panel housing top (for devices with the SpO2 option, includes SpO2 logo label)	M1092523
2	Jack ground plate	6600-2134-500
3	Jack plate, Scale/ Pat. probe	6600-2127-500
4	Split ring washer, M3 x 3.1 ID 0.8	6600-0713-402
5	Screw, M3 x 8 Btn Hd, SpO2 ground	6600-0706-405
6	Washer, M4 x 4.3 ID 0.8	6600-0712-403
7	Split ring washer, M4 x 4.1, 0.9	6600-0713-403
8	Screw, M4 x 12 Skt Hd	6600-0707-410
9	SpO2 flex circuit assembly	See 7.9 Harness list on page 202 .
10	Tension clip	M1110360
11	Washer, M3 x 3.2 ID 0.5	6600-0712-402
12	Masimo SET 2 SpO2 circuit board Nellcor SpO2 circuit board	M1222404 M1222398
13	Star washer, M3 x 3.2 ID 0.4 Int	6600-0713-431
14	Probe panel housing bottom	6600-2124-500

Callout	Part	Part number
15	The parts are included in harness assemblies.	See 7.9 Harness list on page 202 .

7.3.3 Probe panel housing with ResusView™ Heart Rate (HR) option (Panda iRes bedded only)

Figure 7-7 Probe panel housing with ResusView Heart Rate (HR) option (Panda iRes)



Callout	Part	Part number
1	Probe panel housing top	M1092523
2	Probe panel middle housing	2101676-001
3	SVC, ECG acquisition board Assy, FRU for 2088556-001	2104029-001
4	HR interface board mounting plate	2101767-001
5	Probe panel housing bottom	6600-2124-500
6	PCB Assy HR interface board (FRU for 2100487-001)	2104030-001
7	Harness warmer HR ECG	2101674-001
8	Standoff, M4	2103266-001
9	Plate, EMC	2106606-001

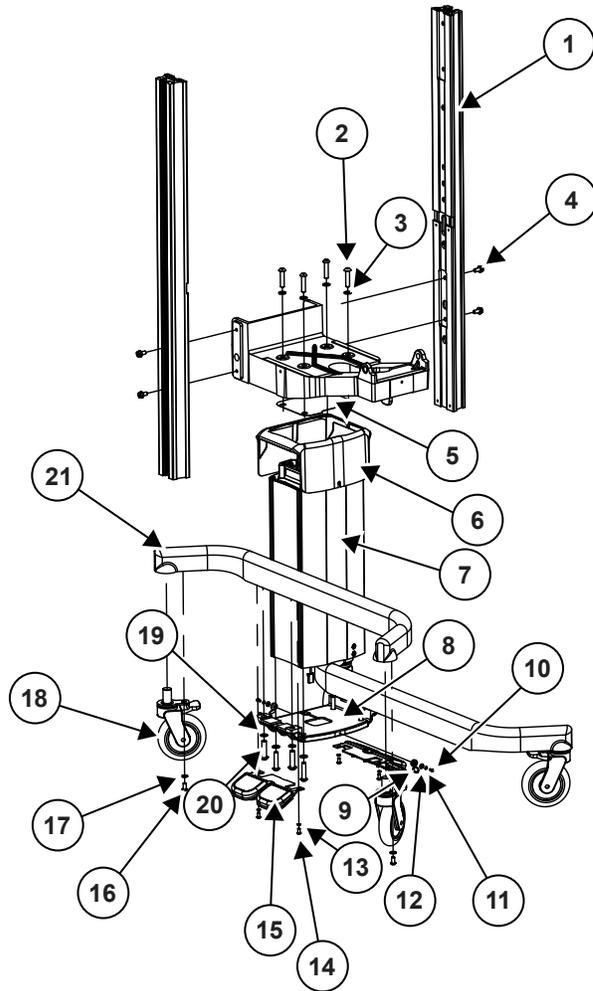
7.4 Base assembly (bedded only)

Elevating column special instructions

Depending on the age of a device, 1 of 2 elevating columns are used. Newer devices display a label with a part number near the top of the elevating column. Older devices do not display a label. See [Figure 7-8 Base assembly on page 184](#) for shared part numbers. See [Table](#)

[7-4 Elevating column on page 185](#) for part numbers that differ between the 2 variants of the elevating column.

Figure 7-8 Base assembly



Callout	Part	Part number
1	Dovetail rail (includes labels)	M1118409
2	Screw	See Table 7-4 Elevating column on page 185 .
3	Split ring washer	See Table 7-4 Elevating column on page 185 .
4	Screw, M8 x 20, skt flange lock	6600-1295-400
5	Insulating sheet	See Table 7-4 Elevating column on page 185 .
6	Base shroud	See Table 7-4 Elevating column on page 185 .
7	Elevating Column	See Table 7-4 Elevating column on page 185 .
8	Base plate	See Table 7-4 Elevating column on page 185 .
9	Hinged screw cover. 1/4	6600-1206-403
10	Screw, M4 X 10 Btn Hd	6600-0706-409

Callout	Part	Part number
11	Split ring washer, M4 X 4.1ID, 0.9	6600-0713-403
12	Washer, M4 X 4.3 ID, 12 OD	6600-0712-446
13	Lock washer, M6 X 6.4ID, 0.7, Ext Tooth	6600-0713-445
14	Screw, M6 X 12 Btn Hd	6600-0706-427
15	Foot switch	M1108745
16	Screw, M8x16, Btn Hd Nylock	6600-0706-435
17	Washer, M8 X 8.4 ID, 1.6	6600-0712-406
18	Caster	6600-0890-400
19	Split ring washer, M12 X 12.2 ID, 2.5	6600-0713-408
20	Screw, M12 X 45, Btn Hd	6600-0706-449
21	Leg	6600-1599-500
22	Plug M20 Thrd for fixed adjustable base (not shown)	M1079772

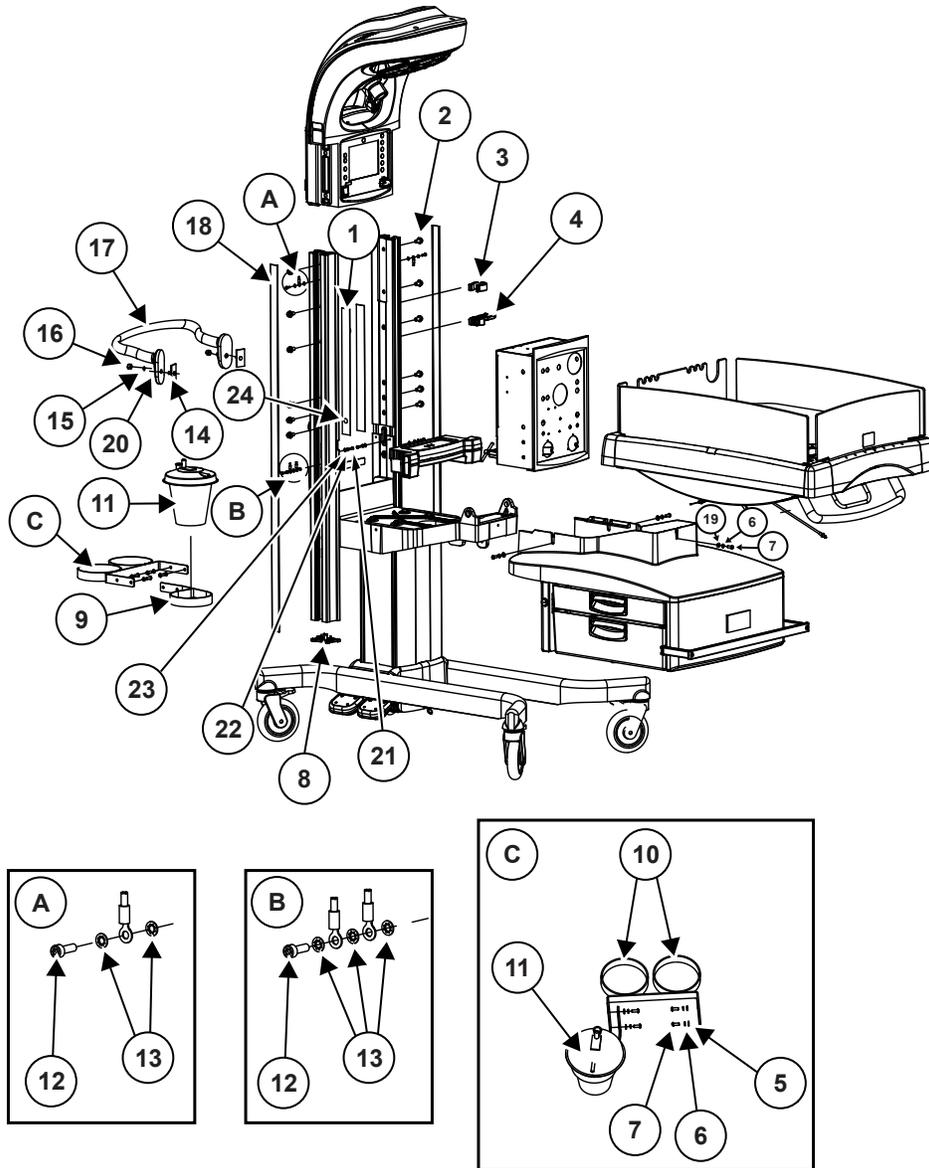
NOTE

It is important to select the correct version of elevating column as they are not forward or backward compatible. Read thoroughly and understand the [elevating column special instruction on page 182](#) before selecting a part number.

Table 7-4 Elevating column

Callout	Description	Variant 1 (part number IS NOT displayed)	Variant 2 (part number IS displayed)
2	Screw, M10x45, btn hd	M1074119	N/A
2	Screw, M8x40, btn hd	N/A	M1161801
3	Split ring washer, M10	6600-0713-407	N/A
3	Split ring washer, M8	N/A	6600-0713-406
5	Insulating sheet	M1106932	M1161569
6	Base shroud	6600-2048-500	M1152760
7	Elevating column, 115 VAC	6600-2049-501	M1137168
7	Elevating column, 230 VAC	6600-2049-502	M1137170
7	Elevating column, 100 VAC	N/A	M1137172
7	Elevating column, manually adjusted	6600-2049-504 (pin design)	M1137173 (crank handle design)
8	Base plate	6600-2094-500	M1154653
	Main bracket	6600-2050-500	M1156495

Figure 7-9 Rail attachments



Callout	Part	Part number
1	Cover strip, plastic (devices without resuscitation option)	6600-2130-500
2	Screw, flange lock	6600-1295-400
3	Tube routing clip	6600-0862-501
4	Bag and mask holder	6600-2150-500
5	Washer, M6	6600-0712-405
6	Split ring washer, M6	6600-0713-405
7	Screw, M6 x 16 Btn Hd	6600-0706-428
8	Rail end cap	6600-2055-500
9	Canister holder	6600-2149-500
10	"E" cylinder guard	6600-2135-500

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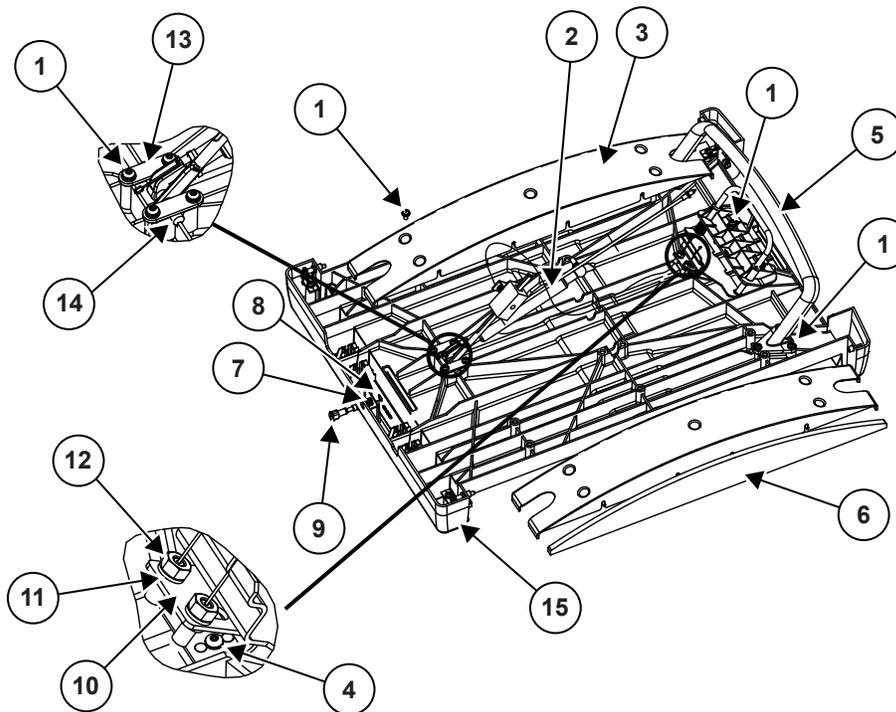
Callout	Part	Part number
	"C" cylinder guard	M1143833
11	Suction canister	M1064655
12	Screw, M4 x 12 Socket Hd, SpO2 ground	6600-0706-410
13	Star washer, M4 Int SpO2 ground	6600-0713-432
14	Lug assy	6600-0868-800
15	Split ring washer, M8	6600-0713-406
16	Cap nut, M8	6600-1215-400
17	Back maneuvering handle	2063211-001
18	Decorative strip, Plastic	6600-2053-500
	Strip, Wood Nat Oak	6600-1666-501
	Strip, Wood Med Oak	6600-1666-502
	Strip, Wood Cherry Maple	6600-1666-503
	Strip, Wood Nat Maple	6600-1666-504
19	Washer, 1/4 inch, 059 thk	6600-0252-400
20	Washer, M8	6600-1284-400
21	Screw, M4 x 12 mm Skt Hd	6600-0707-410
22	Split ring lock washer, M4	6600-0713-403
23	Washer, M4	6600-0712-403
24	Loop fastener (Velcro)	6600-1177-400

Parts not shown

Metal spacer plate (resuscitation option only): 6600-2137-500

7.5 Bed assembly (bedded only)

Figure 7-10 Bed assembly

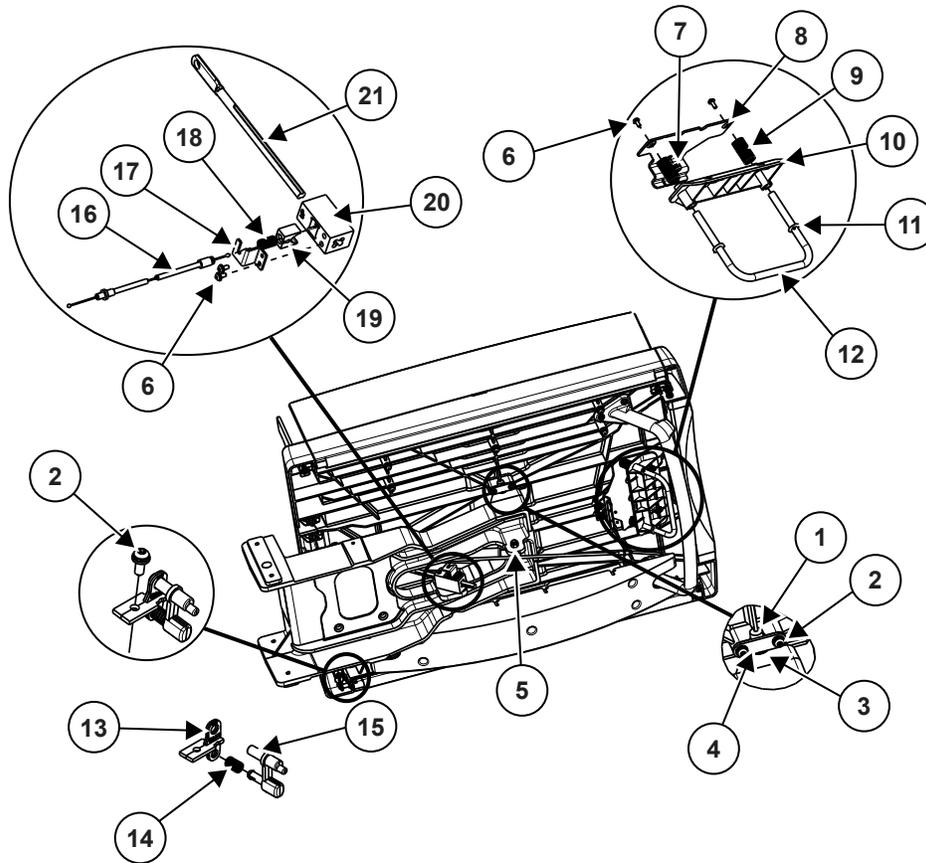


Callout	Part	Part number
1	Screw, M6 X 16, Skt Btn Hd, w/ split ring & flat washer	M1110521
2	Hydraulic tilt cylinder	6600-1650-500
3	Pontoon	6600-2060-500
4	Screw, M4 X 10, Skt Btn Hd, w/ split ring and flat washer	6600-0908-401
5	Front handle	2075719-001
6	Pontoon Wood Inlay Natural Maple Cherry Maple Medium Oak Natural Oak	6600-1665-504 6600-1665-503 6600-1665-502 6600-1665-501
7	Spring, rear button release	6600-1291-400
8	E-clip 375 X .025, mounting shaft	6600-1045-400
9	Rear side panel release	6600-1657-500
10	Bracket Cable End Coupling	M1073747
11	Nut, hex 1/4-20	0144-3136-113
12	Split ring washer 1/4	6600-0473-400
13	Axle strap	6600-1662-500

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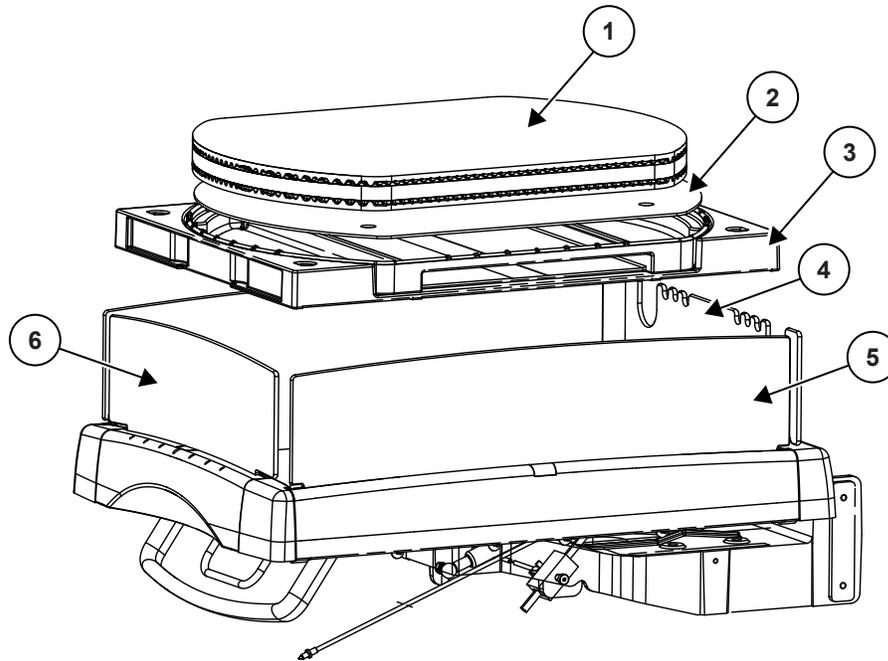
Callout	Part	Part number
14	Tilt cylinder pivot pin	6600-2072-500
15	Panda (L&D) Bed	M1190337
	Giraffe (NICU) Bed	M1190332

Figure 7-11 Bed assembly 2



Callout	Part	Part number
1	Main axle	6600-2070-500
2	Screw, M6 X 16, Skt Btn Hd, w/ split ring & flat washer	M1110521
3	Bearing, plastic clip	6600-2071-500
4	Axle strap	6600-1662-500
5	Lock nut, M8 X 1.25	6600-0714-405
6	Screw, M4 X 10, Skt Btn Hd, w/ split ring and flat washer	6600-0908-401
7	Grommet	M1107531
8	Damper cable bracket	6600-1663-500
9	Spring, .66 OD x 1.5L	6600-1292-400
10	Damper release handle bracket	6600-1660-500
11	O-ring	M1072016
12	Tilt release handle	6600-2073-500
13	Side panel keeper	6600-2068-500
14	Spring, side panel release	6600-1290-400
15	Side panel release	6600-2069-500
16	Secondary Lock Cable	M1073749
17	Bracket, cable	M1073280

Callout	Part	Part number
18	Spring, secondary lock	M1073281
19	Slide Lock Secondary Lock	M1073278
20	Block Housing Secondary Lock	M1073279
21	Threaded Strut Secondary Lock	M1073277

Figure 7-12 Bed assembly 3 (Giraffe Warmer shown)

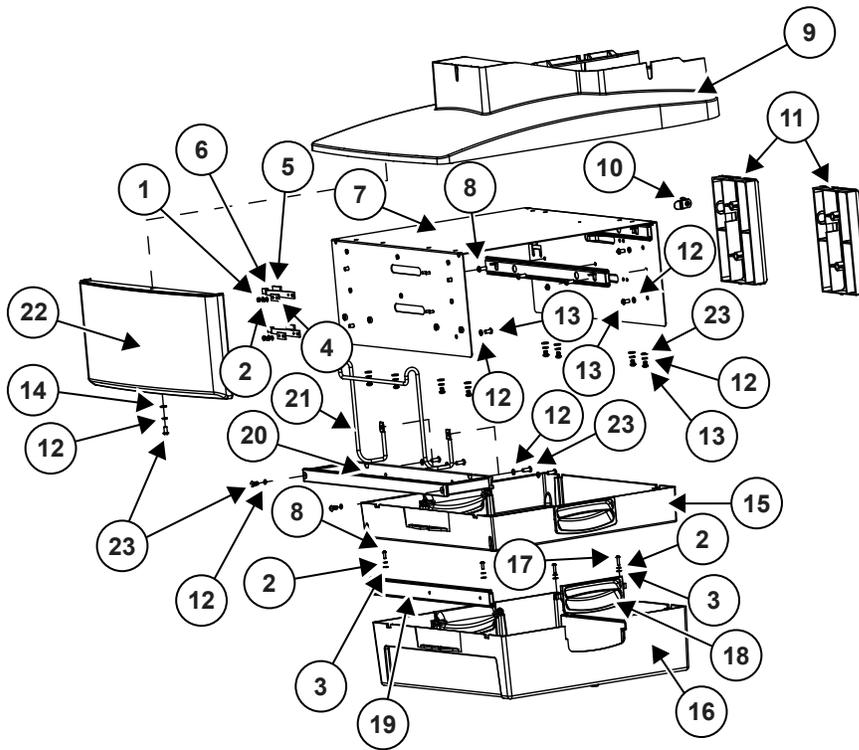
Callout	Part	Part number
1	Mattress, Giraffe	2076066-001
	Mattress, Panda	6600-2057-500
2	Mattress support plate, Giraffe	6600-1365-500
	Mattress support plate, Panda	6600-2058-500
3	Translation deck (Giraffe only)	6600-1352-500
	Mattress tray support	6600-1353-500
	X-ray tray	6600-1334-500
	Locking latch	6600-1363-500
	Latch cover	6600-1364-500
	Latch spring	6600-1079-400
4	Rear bedside panel assy, Giraffe	6600-1655-500
	Rear bedside panel assy, Panda	6600-2063-500
	Rear bedside panel assy, tubing management, Giraffe	6600-2146-500
	Rear bedside panel assy, tubing management, Panda	6600-2145-500
5	Left/right bedside panel assy, Giraffe	5853404-01 (English part number) For all non-US regions, see 7.12.7 Bedside panel accessories on page 209 for the region specific part number.

Callout	Part	Part number
	Left/right bedside panel assy, Panda	5853398-01 (English part number) For all non-US regions, see 7.12.7 Bedside panel accessories on page 209 for the region specific part number.
	Left/right HFOV bedside panel assy, Giraffe	5853407-01 (English part number) For all non-US regions, see 7.12.7 Bedside panel accessories on page 209 for the region specific part number.
	Left/right HFOV bedside panel assy, Panda	5853401-01 (English part number) For all non-US regions, see 7.12.7 Bedside panel accessories on page 209 for the region specific part number.
	Left/right tall bedside panel, Giraffe	5853408-01 (English part number) For all non-US regions, see 7.12.7 Bedside panel accessories on page 209 for the region specific part number.
	Left/right tall bedside panel, Panda	5853402-01 (English part number) For all non-US regions, see 7.12.7 Bedside panel accessories on page 209 for the region specific part number.
6	Front bedside panel assy, Giraffe	5853405-01 (English part number) For all non-US regions, see 7.12.7 Bedside panel accessories on page 209 for the region specific part number.
	Front bedside panel assy, Panda	5853399-01 (English part number) For all non-US regions, see 7.12.7 Bedside panel accessories on page 209 for the region specific part number.
	Front bedside panel assy, tubing management, Giraffe	5853406-01 (English part number) For all non-US regions, see 7.12.7 Bedside panel accessories on page 209 for the region specific part number.

Callout	Part	Part number
	Front bedside panel assy, tubing management, Panda	5853400-01 (English part number) For all non-US regions, see 7.12.7 Bedside panel accessories on page 209 for the region specific part number.
	Front tall bedside panel, Giraffe	5853409-01 (English part number) For all non-US regions, see 7.12.7 Bedside panel accessories on page 209 for the region specific part number.
	Front tall bedside panel, Panda	5853403-01 (English part number) For all non-US regions, see 7.12.7 Bedside panel accessories on page 209 for the region specific part number.

7.6 Storage options (bedded only)

Figure 7-13 Double drawers



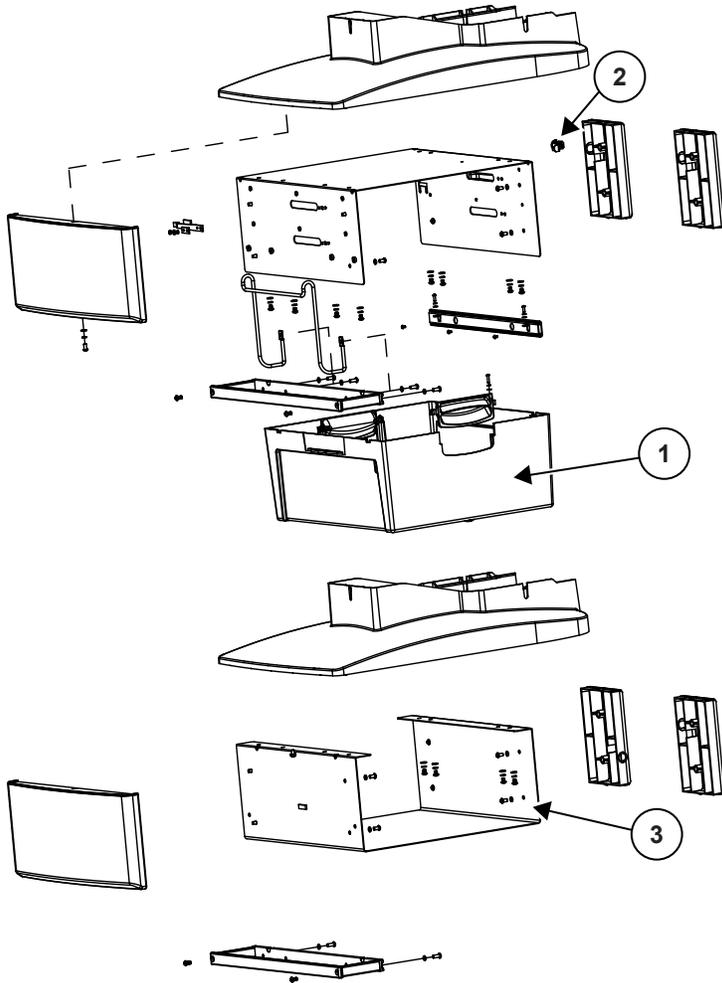
Call out	Part	Part number
1	M-4 hex nut	6600-0711-407
2	Spit ring washer, M4 x 4.1 ID X 0.9	6600-0713-403
3	Washer, M4 x 4.3 ID 0.8	6600-0712-403
4	Drawer retainer strip	6600-2113-500
5	Tape UHMW Poly 1.1 inch long	6600-1758-503
6	Drawer stop spring	6600-2114-500
7	Drawer, support brkt	6600-2118-500
8	Screw, M4 x 10 Btn Hd	6600-0706-409
9	Shroud, 20 inch, plastic	6600-2088-500
10	Drawer mounting lock Dble drwr cam	2080959-001 M1079777
11	Drawer support cover	6600-2117-500
12	Split ring washer, M6 x 6.1 ID 1.6	6600-0713-405
13	Screw, M6 x 16 Btn Hd	6600-0706-428
14	Washer, M6 X 6.4 ID 1.6	6600-0712-405

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Call out	Part	Part number
15	Drawer, 2.75 inch, Plastic Drawer, 2.75 inch, wood NAT OAK Drawer, 2.75 inch, wood MED OAK Drawer, 2.75 inch, wood CHERRY MAPLE Drawer, 2.75 inch, wood NAT MAPLE	6600-2085-500 6600-1667-501 6600-1667-502 6600-1667-503 6600-1667-504
16	Drawer, 5 inch, Plastic	6600-2086-500
17	Screw, M4 x 16, Btn Hd	6600-0706-411
18	Plastic handle (Plas. Dwrs only)	6600-2116-500
19	Drawer slide assy	6600-2087-500
20	Din rail upgrade kit	M1143466
21	Pleur-evac hanger, front	6600-2115-500
22	Shroud skirt Requires Branding Label Set. Choose M1111360 Label Set Giraffe Branding or M1111366 Label Set Panda Branding as appropriate.	6600-2119-500* ¹
23	M6 x 12 Btn Hd Cap Screw	6600-0706-427

*1 See [7.13 Labels on page 216](#).

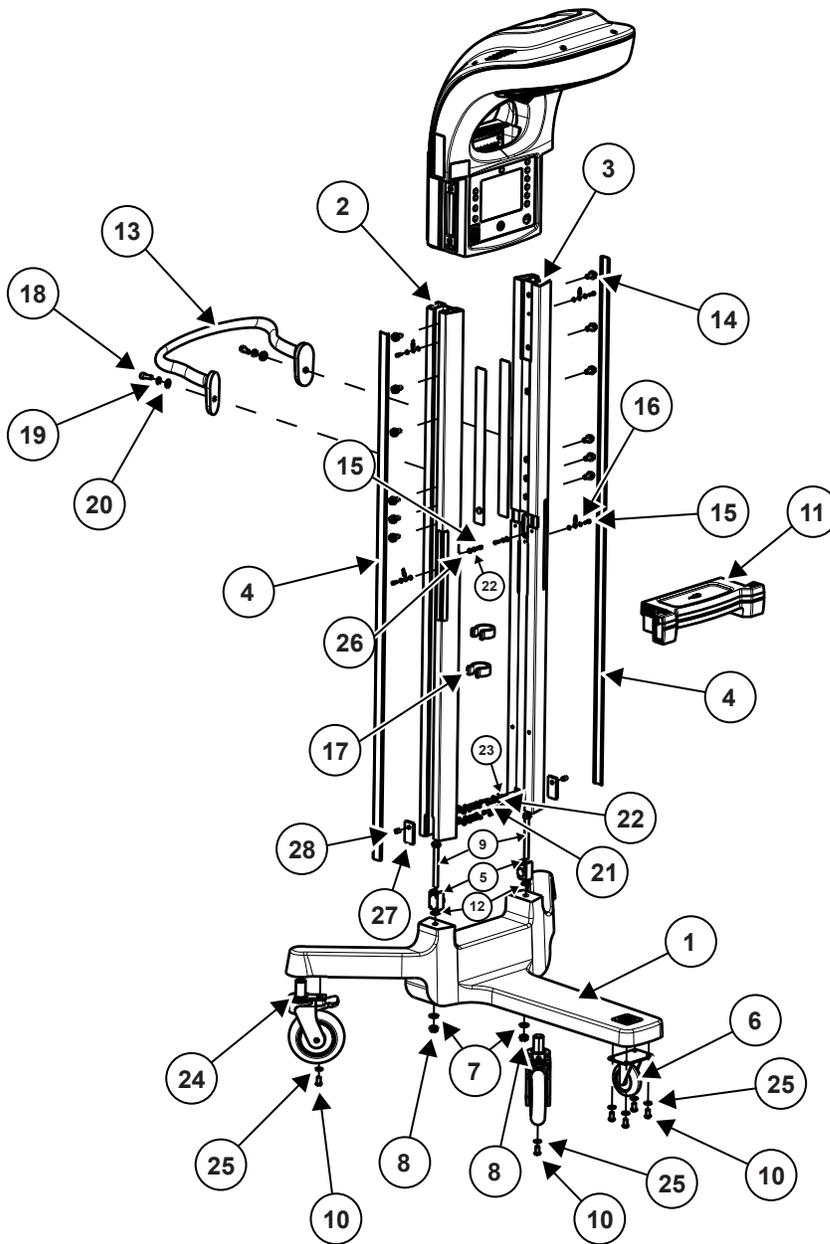
Figure 7-14 Single drawer and storage shelf



Call out	Part	Part number
1	Drawer, 8 inch, Plastic Drawer, 8 inch, wood NAT OAK Drawer, 8 inch, wood MED OAK Drawer, 8 inch, wood CHERRY MAPLE Drawer, 8 inch, wood NAT MAPLE	6600-2120-500 6600-2123-501 6600-2123-502 6600-2123-503 6600-2123-504
2	Drawer mounting lock Sgle Drwr cam	2080959-001 M1097627
3	Shelf	6600-2090-500

7.7 Freestanding model parts

Figure 7-15 Freestanding model (exploded view)



Callout	Part	Part number
1	FS Base* ¹	2063202-001
2	FS Rail, West* ¹	2063201-001
3	FS Rail, East* ¹	2063198-001
4	FS Appearance Strip	2063196-001
5	FS Rail Mounting Block* ¹	2063203-001
6	FS Caster	2063285-001

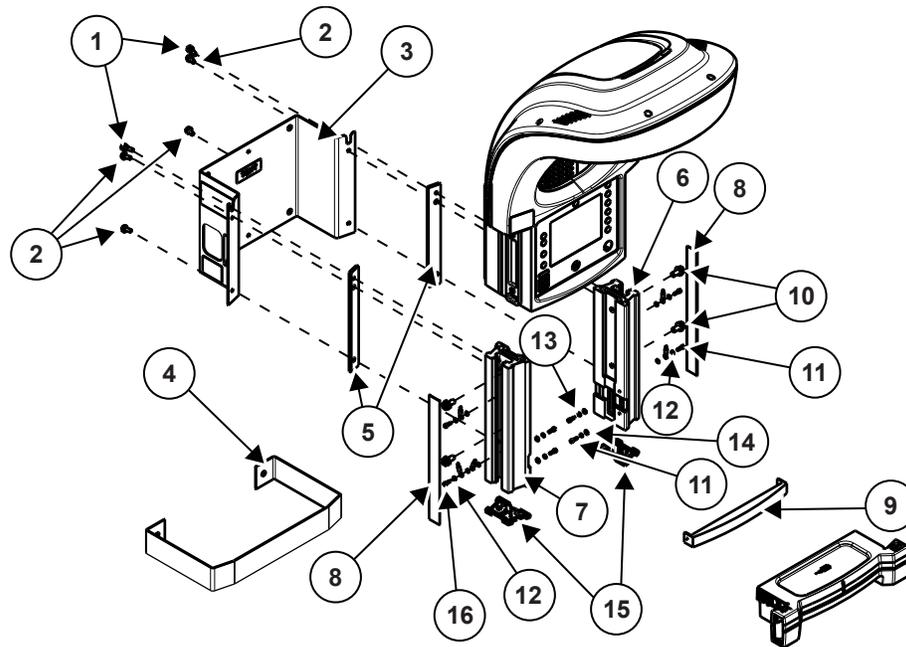
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Callout	Part	Part number
7	M10 Flat Washer	2063283-001
8	M10 Lock Nut	2063281-001
9	M10x80 Hex HD Screw ^{*1}	2063282-001
10	M8x16 BTN HD Screw with Patch	6600-0706-435
11	FS Probe Panel Housing Top	2063209-001
12	M10 Push Nut ^{*1}	2062793-001
13	FS North Handle	2063211-001
14	M8 Flange Lock Screw	6600-1295-400
15	M4x12 SKT HD CAP Screw	6600-0707-410
16	INT Tooth Lock Washer	6600-0713-432
17	Hose Retaining Clip	6600-0862-501
18	M8 Socket HD CAP Screw	6600-0707-428
19	M8 Split Lock Washer	6600-0713-406
20	M8 Flat Washer	6600-1284-400
21	M4x25 Socket HD CAP Screw	6600-0707-448
22	M4 Split Lock Washer	6600-0713-403
23	M4 oversized Flat Washer	6600-0712-446
24	Caster, Dual Lock	6600-0890-400
25	M8 Flat Washer	6600-0712-406
26	M4 Flat Washer	6600-0712-403
27	Retaining Plate	2067984-001
28	M8 Set Screw	2068114-001

*1 Order and use new M4 screws (6600-0707-448) when replacing this part. See [8.7.6 Base and rail mounting block replacement \(freestanding only\) on page 298](#).

7.8 Wall mount model parts

Figure 7-16 Wall mount model (exploded view)



Callout	Part	Part number
1	M6 Shoulder Screw	2063284-001
2	M6x16 Btn Hd Screw with Captive Washers	M1110521
3	FRU Wall Mount Warmer Bracket Kit	See Table 7-5 FRU Wall Mount Warmer Bracket Kit on page 201.
4	FRU Wall Mount Warmer Bumper Kit	2063179-001
5	Wall Mount (WM) Spacer	2063197-001
6	Wall Mount Rail, East	2063204-001
7	Wall Mount Rail, West	2063205-001
8	Wall Mount Appearance Strip	2063200-001
9	Wall Mount Filler Panel	2063199-001
10	M8 Flange Lock Screw	6600-1295-400
11	M4x12 Skt Hd Cap Screw	6600-0707-410
12	INT Tooth Lock Washer	6600-0713-432
13	M4 Split Lock Washer	6600-0713-403
14	M4 Flat Washer	6600-0712-403
15	Rail Endcap	6600-2055-500
16	M4x8 Skt Hd Cap Scr	6600-0707-408

Table 7-5 FRU Wall Mount Warmer Bracket Kit

Kit	Part number
FRU WM Warmer Bracket KIT, USA	2063184-001
FRU WM Warmer Bracket KIT, English Intl	2063184-002
FRU WM Warmer Bracket KIT, French	2063184-003
FRU WM Warmer Bracket KIT, Spanish	2063184-004
FRU WM Warmer Bracket KIT, German	2063184-005
FRU WM Warmer Bracket KIT, Italian	2063184-006
FRU WM Warmer Bracket KIT, Swedish	2063184-007
FRU WM Warmer Bracket KIT, Japanese	2063184-008
FRU WM Warmer Bracket KIT, Russian	2063184-009
FRU WM Warmer Bracket KIT, Greek	2063184-010
FRU WM Warmer Bracket KIT, Dutch	2063184-011
FRU WM Warmer Bracket KIT, Portuguese	2063184-012
FRU WM Warmer Bracket KIT, Danish	2063184-013
FRU WM Warmer Bracket KIT, Finnish	2063184-014
FRU WM Warmer Bracket KIT, Turkish	2063184-015
FRU WM Warmer Bracket KIT, Polish	2063184-016
FRU WM Warmer Bracket KIT, Chinese	2063184-017
FRU WM Warmer Bracket KIT, Norwegian	2063184-018
FRU WM Warmer Bracket KIT, Czech	2063184-019
FRU WM Warmer Bracket KIT, Estonian	2063184-020
FRU WM Warmer Bracket KIT, Hungarian	2063184-021
FRU WM Warmer Bracket KIT, Bulgarian	2063184-022
FRU WM Warmer Bracket KIT, Lithuanian	2063184-023
FRU WM Warmer Bracket KIT, Romanian	2063184-024
FRU WM Warmer Bracket KIT, Korean	2063184-025
FRU WM Warmer Bracket KIT, Slovakian	2063184-026
FRU WM Warmer Bracket KIT, Croatian	2063184-027
FRU WM Warmer Bracket KIT, Indonesian	2063184-028
FRU WM Warmer Bracket KIT, Serbian	2063184-029

Table 7-6 FRU Wall Mount Warmer Bumper Kit (2063179-001) content

Part	Quantity
Wall Mount Bumper	1
0.375-16 x 2.5 Hex Hd Screw (6600-0414-400)	2
0.375 Split Lock Washer (6600-0440-400)	2
0.406 ID Flat Washer (6600-0173-400)	2
Toggler Anchor Bolt (6600-0413-400)	2

Table 7-7 FRU Wall Mount Warmer Bracket Kit (language-specific) content

Part	Quantity
Wall Mount Bracket with language-specific wall mount label set	1
0.375-16 x 2.5 Hex Hd Screw (6600-0414-400)	4
0.375 Split Lock Washer (6600-0440-400)	4
0.406 ID Flat Washer (6600-0173-400)	4
Toggler Anchor Bolt (6600-0413-400)	4
Serial Number Label Overlay	1
Blank Label	1

7.9 Harness list

Table 7-8 Harness list

Description	Part number
OEM part, harness, warmer LCD	6600-1412-600
Harness, Heater/T-Stat/Power Supply	6600-1558-700
FRU KIT, HALOGEN TRANSFORMER 115V, WARMER	5514157
Harness, 230vac Halogen Transformer	5896790
Harness, Ebase Power Cord (Bedded Models Only)	6600-1562-700
Harness, Speaker	6600-1563-700
Harness, Thermalink	6600-1564-700
Harness, Control Brd Power	6600-1567-700
Harness, Patient Probe	6600-1572-702
Harness, Door Switch, Battery, Speaker	6600-1573-700
Harness, Mains Power	6600-1574-700
Harness, Scale Rail	6600-1586-700
Harness, Scale Rail (Panda iRes (Bedded) with ResusView Heart Rate (HR) Option Only)	2101454-001
Harness, SpO2 Rail (Bedded Model Only)	6600-1587-700
Wire Harness Warmer Observation Light Switch	6600-1588-700
Harness, Obso Light	6600-1594-700
Harness, Control Board Ribbon	6600-1411-601
Harness, Alarm Board Signal	6600-1411-602
Harness Warmer Foot Switch Signals	M1073604
Harness, Warmer, Over-Temp T-Stat	M1074875
Harness Line Filter	M1107967
Harness, Power Factor	M1113026
Harness, Ground wire, Patient Probe Plate	M1113148
Power Supply Bracket Ground	M1126279

Table 7-8 Harness list (Table continued)

Description	Part number
Rail Ground	M1126289
Heater Duct Ground	M1126291
Dish Ground	M1126293
Masimo SET 2 SpO2 Flex Circuit	M1233644
Nellcor SpO2 Flex Circuit	M1233645
SpO2 Shield Ground Wire	M1144733
Harness, Warmer HR ECG (Panda iRes (Bedded) with ResusView Heart Rate (HR) Option Only)	2101674-001
Harness, Warmer HR USB (Panda iRes (Bedded) with ResusView Heart Rate (HR) Option Only)	2101675-001
Harness, Warmer HR Ext Scale Conn (Panda iRes (Bedded) with ResusView Heart Rate (HR) Option Only)	2100489-001
Harness, Warmer HR Ext Scale Conn (Non-HR option)	2101766-001
FRU Kit, HARNESS OBS LIGHT DIMMER, SWITCH, 115V WARMER	5514159

7.10 Giraffe scale service parts

Figure 7-17 Giraffe scale service parts

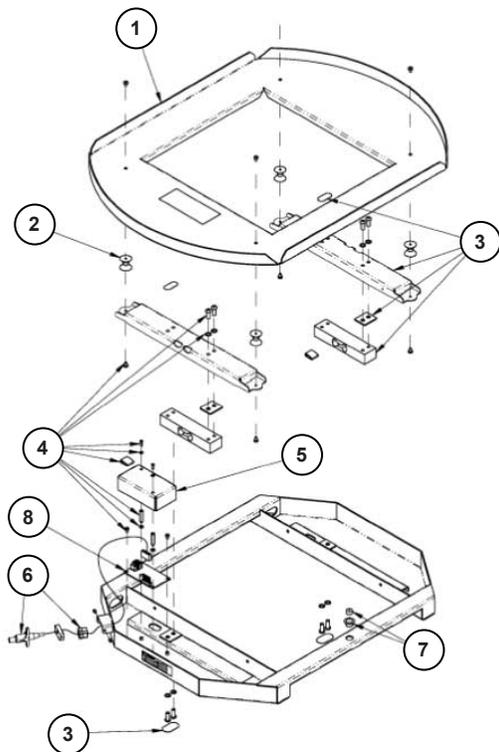


Table 7-9 Giraffe scale service parts

Item	Part	Part number
1	Giraffe Scale Top Tray	M1131119

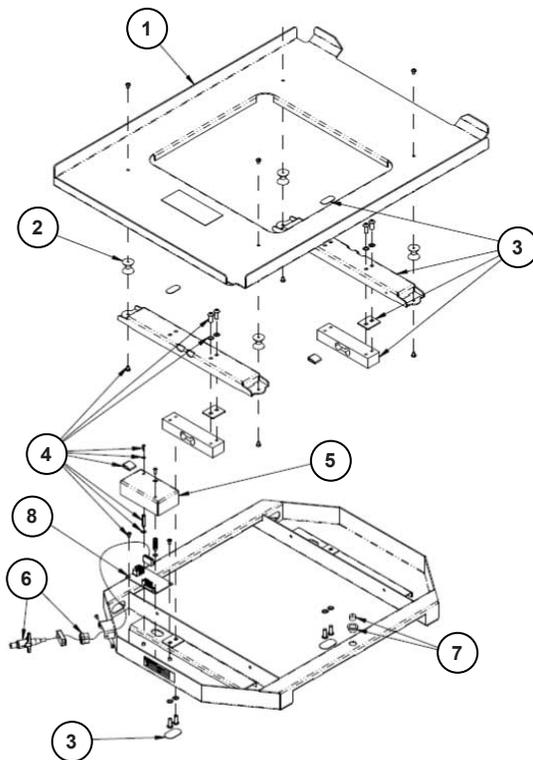
Table 7-9 Giraffe scale service parts (Table continued)

Item	Part	Part number
2	Shock Absorber Kit	M1131120
3	In Bed Scale Load Cell Kit	M1131131
4	In Bed Scale Hardware Kit	M1131133
5	Control Board Cover	M1131123
6	Cable Kit	2068227-001
7	Bubble Level	M1131130
8	Control Board for Non-NAWI Scales	2068225-001
	Control Board for NAWI Scales	2070929-001

NOTE

Scale control board FRU will come with latest software version and is compatible with all versions of Shekel Scales.

7.11 Panda scale service parts

Figure 7-18 Panda scale service parts**Table 7-10 Panda scale service parts**

Item	Part	Part number
1	Panda Scale Top Tray	M1131132
2	Shock Absorber Kit	M1131120
3	In Bed Scale Load Cell Kit	M1131131

Table 7-10 Panda scale service parts (Table continued)

Item	Part	Part number
4	In Bed Scale Hardware Kit	M1131133
5	Control Board Cover	M1131123
6	Cable Kit	2068226-001
7	Bubble Level	M1131130
8	Control Board for Non-NAWI Scales	2068225-001
	Control Board for NAWI Scales	2070929-001

NOTE

Scale control board FRU will come with latest software version and is compatible with all versions of Shekel Scales.

7.12 Options

7.12.1 Accessories

Table 7-11

Part number	Description
2074816-001	PATIENT PROBE DISP 10 PK
2074817-001	PATIENT PROBE DISP 50 PK
2075796-001	REUSABLE PATIENT PROBE ROHS
0203-1980-300	PATCH HEAT REFLECTING ROHS
6600-0837-800	TUBING MANAGEMENT ARM
6600-0670-800	Tubing management arm with Dovetail
5805041	Panda Warmer Refresh Kit
5805040	Giraffe Warmer Refresh Kit
M1169540	INFANT RESTRAINTS, PACK OF 5
6600-0031-900	Bracket Bird Blender
6700-0411-800	MANIFOLD BRACKET OXYGEN
Region specific Contact your sales representative for the region specific/language specific part number.	Giraffe Shuttle
Region specific Contact your sales representative for the region specific/language specific part number.	Uninterruptible Power Supply (UPS)
M1146442 The part numbers are gravity zone specific.	Giraffe IN-BED SCALE EU
M1125056	SCALE GIRAFFE IN-BED

Table 7-11 (Table continued)

Part number	Description
M1146445 The part numbers are gravity zone specific.	Panda IN-BED SCALE EU
M1125055	SCALE PANDA IN-BED
M1160738	ECO-PACK, reusable packaging

7.12.2 SpO2 system accessories

7.12.2.1 Masimo SpO2 system accessories

The list of accessories that follows is supplied for reference only and is not a complete list of compatible Masimo sensors. Use only RDSet, LNOP, or LNCS Masimo oximetry sensors for SpO2 measurements.

WARNING



PATIENT INJURY HAZARD

The use of accessories, transducers and cables other than those specified or provided by the manufacturer of this equipment could result in increased electromagnetic emissions or decreased electromagnetic immunity of this equipment and result in improper operation.

Table 7-12

Part number	Description
2059005-001	Masimo Cable, Red, LNCS 4ft/1.2m
2059007-001	Masimo Cable, Red, LNCS 14ft/4.3m
2059006-001	MASIMO CABLE RED LNC-10
2017002-003	Care Masimo SpO2 Cable, 6 ft
2027263-002	Masimo LNC-10 GE Cable, 10ft for Dash, Tram, Corometrics
MASIMO-RD-4002	RD SET INF, ADHESIVE SENSOR, BOX 20
MASIMO-RD-4003	RD SET NEO, ADHESIVE SENSOR, BOX 20
MASIMO-RD-4004	RD SET NEO PT, ADHESIVE SENSOR, BOX 20
MASIMO-RD-4084	RD SET GE-05, PATIENT CABLE, 1.5M/5FT
MASIMO-RD-4085	RD SET GE-12, PATIENT CABLE, 3.6M/12FT
MASIMO-RD-4103	RD SET MD20 -05, PATIENT CABLE, 1.5M/5FT
MASIMO-RD-4104	RD SET MD20- 12, PATIENT CABLE, 3.6M/12FT
MASIMO-RD-4046	RD SET INF REPLACEMENT TAPES, BOX 102
MASIMO-RD-4047	RD SET NEO REPLACEMENT TAPES, BOX 102
MASIMO-RD-4048	RD SET NEO PT REPLACEMENT WRAPS, BOX 10
2051068-001	LNCS INF, INFANT ADHESIVE SENSORS 20/BOX
2051069-001	LNCS NEO, NEONATAL/ADULT ADH SNSR 20/BOX

Table 7-12 (Table continued)

Part number	Description
2051070-001	LNCS NEOPT, NEO PRETERM ADH SNSR 20/BOX

7.12.2 Nellcor SpO2 system accessories

The list of accessories that follows is supplied for reference only and is not a complete list of compatible Nellcor sensors. Use only Nellcor SpO2 sensors with OxiMax™ technology.

WARNING



PATIENT INJURY HAZARD

The use of accessories, transducers and cables other than those specified or provided by the manufacturer of this equipment could result in increased electromagnetic emissions or decreased electromagnetic immunity of this equipment and result in improper operation.

Table 7-13

Part number	Description
2008773-001	CABLE DOC-10 NELLCOR
2059001-001	Nellcor OxiMax SpO2 Cable DOC-4 (4 ft)

7.12.3 Resuscitation system accessories

Table 7-14

Part number	Description
6700-0458-802	HOSE ASSY, O2, DIAMETER INDEX SAFETY SYSTEM (DISS) FITTINGS, 5 FT
6700-0458-804	HOSE ASSY, O2, DIAMETER INDEX SAFETY SYSTEM (DISS) FITTINGS, 8 FT
6700-0458-801	HOSE ASSY, AIR, DIAMETER INDEX SAFETY SYSTEM (DISS) FITTINGS, 5 FT
6700-0458-803	HOSE ASSY, AIR, DIAMETER INDEX SAFETY SYSTEM (DISS) FITTINGS, 8 FT
6700-0302-800	ADAPT DIA O2 DISS M 9/16 -18
6700-0501-800	ADPTR NCG RND O2 DISS MALE
0204-7638-535	ADPTR DISS AIR 1/8 NPTF
6700-0302-803	ADAPT DIA AIR DISS M 3/4 -16
6700-0500-803	ADAPTER NCG RECT AIR 1/8 NPTM
M1151571	Cylinder holder XL for diameter 140-150mm
M1151570	Cylinder holder for diameter 97-117mm
2070857-001	CATCH GAS CYLINDER OPTION ONE PAIR
M1118195	Hose 1/4 ID Vacuum
M1064655	OEM-ITEM, Canister Hydrophobic 800CC Shutoff Filter BIMIS 424410 - Box of 100

7.12.3.1 T-piece resuscitation system accessories

Table 7-15

Part number	Description
2109059-001	NF-150GE, T-PIECE NEONATAL PATIENT CIRCUIT KIT, DISP, 20/BOX
2109060-001	NF-157-0GE, T-PIECE NEONATAL PATIENT CIRCUIT KIT, DISP WITH SIZE 0 MASK,10/BOX
2109061-001	NF-157-1GE, T-PIECE NEONATAL PATIENT CIRCUIT KIT, DISP WITH SIZE 1 MASK,10/BOX

7.12.4 ResusView™ Heart Rate Option accessories

Table 7-16

Part number	Description
2009101-404	Neonatal Leadwires (AHA)
2009101-406	Neonatal Leadwires (IEC)
2106306-002	ECG Trunk Cable, Neonatal DIN 3-lead (AHA, 1.2 m/4 ft)
2106306-004	ECG Trunk Cable, Neonatal DIN 3-lead (IEC, 1.2 m/4 ft)
2103821-001	Panda Warmer ResusView Heart Rate Option Supplement

7.12.5 Shelf accessories

Table 7-17

Part number	Description
6600-0513-801	SHELF ASSY 12X12 INSTR GRAY
M1150618	Rear Shelf 12.00 x 26.00
6600-1793-500	SHELF INTERNAL SE AND NW
6600-1794-500	SHELF INTERNAL NE AND SW
6600-0865-700	INSTRUMENT SHELF, RoHS

7.12.6 Mattress accessories

Table 7-18

Part number	Description
6600-2057-500	PANDA MATTRESS
M1046467	Giraffe Pressure Diffusing Mattress
2076066-001	Giraffe Pressure Diffusing Mattress with cover sheet
6600-1116-500	FOAM MATTRESS GH GI
6600-0688-800	Giraffe mattress cover sheet

7.12.7 Bedside panel accessories

To order language-specific bedside panels: XXXXXX-YY (XXXXXX is bedside panel, YY is language)

1. Select bedside panel from [Table 7-20 on page 209](#)
2. Select language from [Table 7-21 on page 209](#)

For example, to order the Giraffe South standard bedside panel-English the part number is 5853405-01.

Table 7-19 Bedside panel orientation

	1. West (side) bedside panel
	2. North (rear) bedside panel
	3. East (side) bedside panel
	4. South (front) bedside panel

Table 7-20

Part number	Description
6600-2146-500	Giraffe North tubing management bedside panel
6600-1655-500	Giraffe North standard bedside panel
5853405-	Giraffe South standard bedside panel
5853406-	Giraffe South tubing management bedside panel
5853409-	Giraffe South tall bedside panel
5853404-	Giraffe East/West standard bedside panel
5853407-	Giraffe East/West HFOV bedside panel
5853408-	Giraffe East/West tall bedside panel
6600-2145-500	Panda North tubing management bedside panel
6600-2063-500	Panda North standard bedside panel
5853399-	Panda South standard bedside panel
5853400-	Panda South tubing management bedside panel
5853403-	Panda South tall bedside panel
5853398-	Panda East/West standard bedside panel
5853401-	Panda East/West HFOV bedside panel
5853402-	Panda East/West tall bedside panel

Table 7-21

Language	Code
English (EN)	01
Bulgarian (BG)	02
Simplified Chinese (ZH-CN)	03
Czech (CS)	04

Table 7-21 (Table continued)

Language	Code
Danish (DA)	05
Dutch (NL)	06
Estonian (ET)	07
Finnish (FI)	08
French (FR)	09
German (DE)	10
Greek (EL)	11
Hungarian (HU)	12
Indonesian (ID)	13
Italian (IT)	14
Kazakh (KK)	15
Korean (KO)	16
Lithuanian (LT)	17
Norwegian (NO)	18
Polish (PL)	19
Portuguese (PT)	20
Romanian (RO)	21
Russian (RU)	22
Slovak (SK)	23
Spanish (ES)	24
Spanish-Latin America (ES-LA)	25
Swedish (SV)	26
Turkish (TR)	27
Croatian (HR)	28
Latvian (LV)	29
Portuguese-Brazil (PT-BR)	30
Serbian (SR)	31

7.12.8 Dovetail rail accessories

Table 7-22

Part number	Description
M1187887	Basket Dovetail 8x5x5
6600-0852-800	DOVETAIL RAIL EXTENSION ASSY
0217-5363-800	ADAPTER SA BIRD/DOVETAIL
M1235864	OEM-ITEM, GCX Arm - 16 Pivot Arm (M-Series) with lock handles
M1236833	OEM-ITEM, GCX Arm - 8 Pivot Arm (M-Series) with lock handle

Table 7-22 (Table continued)

Part number	Description
0217-5374-800	POST ASSY UTILITY
2107357-001	Resuscitation bag clip
6600-0836-800	HOLDER GAS E-CYLINDER
6600-0055-851	KIT HOSE RTNG CLIP (6) GRAY
6700-0180-700	MANIFOLD ASSY DOVETAIL BRKT
6600-0894-214	OEM-ITEM, ARM REAR CHANNEL CM5
6600-0894-215	OEM-ITEM, ARM LEFT/RIGHT CHANNEL C M5
6700-0080-800	BRACKET ACCESSORY MTG
0217-5376-800	POST ASSY UTILITY
M1159084	HANDLE, NORTH END
0217-5357-800	KIT VENTILATOR MTG POST
M1151830	CORD WRAP
407349-026	WL CH 7IN W/OHMEDA DOVE TL MTG
0217-5367-800	SLIDE ASSY SUCTION

7.12.9 IV pole accessories

Table 7-23

Part number	Description
M1083808	IV Pole Dual Hook-24"
6600-0851-800	ROTATING IV POLE
0217-5378-800	IV POLE ASSY ROHS
6600-0491-801	IV POLE ASSY 24 IN IWS ROHS

7.12.10 Silo accessories

Table 7-24

Part number	Description
6600-0853-800	SILO SUPPORT ASSEMBLY
2103843-001	EXTENDED SILO SUPPORT ASSEMBLY

7.12.11 DIN rail accessories

Table 7-25

Part number	Description
M1134410	Side Pluerevac hanger

7.12.12 UPS accessories

Table 7-26

Part number	Description
2103008-001	GIRAFFE 230V UPS KIT AUSTRALIA - ENGLISH
2104240-001	GIRAFFE 230V UPS KIT -CE-EN
2104242-001	GIRAFFE 230V UPS KIT - UK - EN
M1112090	GIRAFFE UPS KIT
M1113987	ASSY-LAU, UPS SHELF, Accessory - Buy

7.12.13 Phototherapy accessories

Table 7-27

Part number	Description
2103121-001 For all non-US regions, contact your sales representative for the region specific/language specific part number.	BILISOFT 2.0 PT SYSTEM ENGLISH US PLUG SMALL PAD
2103122-001 For all non-US regions, contact your sales representative for the region specific/language specific part number.	BILISOFT 2.0 PT SYSTEM ENGLISH US PLUG LARGE PAD
M1097110	Bracket, Bilisoft Male
M1224917 For all non-US regions, contact your sales representative for the region specific/language specific part number.	Giraffe Blue Spot PT, ENG, NA, US
M1231533 For all non-US regions, contact your sales representative for the region specific/language specific part number.	Giraffe Blue Spot PT ENG, IEC, US

7.12.14 Upgrades

Some upgrades might not be available in all regions.

Table 7-28 Resuscitation system upgrades

Part number	Description
M1192226	Resuscitation Field Upgrade Kits

Table 7-28 Resuscitation system upgrades (Table continued)

Part number	Description
M1139417 For all non-US regions, contact your sales representative for the region specific/language specific part number.	Kit, Resuscitation Unit, T-Piece with Blenders and yokes, US
M1139612 For all non-US regions, contact your sales representative for the region specific/language specific part number.	Kit, Resuscitation Unit, Bag, Mask with Blenders, Yokes, US

Table 7-29 HR upgrades

Part number	Description	Panda compatibility constraints
2102783-001	KIT, RESUSVIEW HEART RATE OPTION, UPGD PANDA IRES WARMER, W/CONTL BD AND IEC ALARM UPDATE	Main Application is less than v2.0.0 and Red Alarm Light
2103988-001	KIT, RESUSVIEW HEART RATE OPTION, UPGD PANDA IRS WARMER W/O CONTL BOARD	Main Application is greater than or equal to v3.0.0.29
2103989-001	KIT, RESUSVIEW HEART RATE OPTION, UPGD PANDA IRES WARMER, W/CONTL BD	Main Application is less than v2.0.0 and White Indicator Light
2103762-001	LABEL, UPG. KIT, RESUSVIEW HEART RATE OPTION INSTALLATION INSTRUCTION, PANDA WARMER	

Table 7-30 DIN Rail upgrade

Part number	Description
M1143466	DIN RAIL UPGRADE KIT

Table 7-31 Alarms upgrade

Part number	Description
2090845-001	IEC ALARMS UPGRADE KIT - WITH CD

Table 7-32 Masimo SET 2 SpO2 system upgrades for bedded units with a serial number between HDJMX0000 and HDJR53999

Part number	Description
2081676-001	Masimo SET 2 SpO2 Upgrade Kit with Control BD, Eng- N. American
2081677-001	Masimo SET 2 SpO2 Upgrade Kit with Control BD, ENG UK, French, German, Dutch
2081678-001	Masimo SET 2 SpO2 Upgrade Kit with Control BD, Chinese
2081679-001	Masimo SET 2 SpO2 Upgrade Kit with Control BD, Spanish, Italian
2081680-001	Masimo SET 2 SpO2 Upgrade Kit with Control BD, Danish, Swedish, Norwegian, Finnish
2081681-001	Masimo SET 2 SpO2 Upgrade Kit with Control BD, Russian, Czech, Polish, Greek

Table 7-32 Masimo SET 2 SpO2 system upgrades for bedded units with a serial number between HDJMX0000 and HDJR53999 (Table continued)

Part number	Description
2081682-001	Masimo SET 2 SpO2 Upgrade Kit with Control BD, Bulgarian, Lithuanian, Portuguese, Estonian
2081683-001	Masimo SET 2 SpO2 Upgrade Kit with Control BD, Romanian, Slovak, Turkish
2081684-001	Masimo SET 2 SpO2 Upgrade Kit with Control BD, Korean

Table 7-33 Masimo SET 2 SpO2 system upgrades for all freestanding and wall mount units or bedded units with a serial number of HDJR54000 or higher

Part number	Description
2081666-001	Masimo SET 2 SpO2 Upgrade Kit, English-N. American
2081667-001	Masimo SET 2 SpO2 Upgrade Kit Eng UK, French, German, Dutch
2081668-001	Masimo SET 2 SpO2 Upgrade Kit, Chinese
2081669-001	Masimo SET 2 SpO2 Upgrade Kit, Spanish, Italian
2081670-001	Masimo SET 2 SpO2 Upgrade Kit, Danish, Swedish, Norwegian, Finnish
2081671-001	Masimo SET 2 SpO2 Upgrade Kit, Russian, Czech, Polish, Greek
2081672-001	Masimo SET 2 SpO2 Upgrade Kit, Bulgarian, Lithuanian, Portuguese, Estonian
2081673-001	Masimo SET 2 SpO2 Upgrade Kit, Romanian, Slovak, Turkish
2081674-001	Masimo SET 2 SpO2 Upgrade Kit, Korean

Table 7-34 Nellcor Oximax SpO2 system upgrades

Part number	Description
2081642-001	Nellcor Oximax SpO2 Upgrade Kit, Eng-N. American
2081647-001	Nellcor Oximax SpO2 Upgrade Kit, ENG UK, French, German, Dutch
2081651-001	Nellcor Oximax SpO2 Upgrade Kit, Chinese
2081653-001	Nellcor Oximax SpO2 Upgrade Kit, Spanish, Italian
2081654-001	Nellcor Oximax SpO2 Upgrade Kit, Danish, Swedish, Norwegian, Finnish
2081656-001	Nellcor Oximax SpO2 Upgrade Kit, Russian, Czech, Polish, Greek
2081657-001	Nellcor Oximax SpO2 Upgrade Kit, Bulgarian, Lithuanian, Portuguese, Estonian
2081658-001	Nellcor Oximax SpO2 Upgrade Kit, Romanian, Slovak, Turkish
2081659-001	Nellcor Oximax SpO2 Upgrade Kit, Korean

7.12.15 Giraffe scale

Table 7-35 Giraffe scale

Part	Part number
Giraffe IN-BED Scale EU Gravity Zone 1	M1147621
Giraffe IN-BED Scale EU Gravity Zone 2	M1147623
Giraffe IN-BED Scale EU Gravity Zone 3	M1147624

Table 7-35 Giraffe scale (Table continued)

Part	Part number
Giraffe IN-BED Scale EU Gravity Zone 4	M1147625
Giraffe IN-BED Scale EU Gravity Zone 5	M1147626
Giraffe IN-BED Scale EU Gravity Zone 6	M1147628
Giraffe IN-BED Scale EU Gravity Zone 7	M1147629
Giraffe IN-BED Scale EU Gravity Zone 8	M1147630
Giraffe IN-BED Scale EU Gravity Zone 9	M1147631
Giraffe IN-BED Scale EU Gravity Zone 10	M1147632
Giraffe IN-BED Scale EU Gravity Zone 11	M1147633
Giraffe IN-BED Scale EU Gravity Zone 12	M1147634
Giraffe IN-BED Scale EU Gravity Zone 13	M1147635
Giraffe IN-BED Scale EU Gravity Zone 14	M1147636
Giraffe IN-BED Scale EU Gravity Zone 15	M1147637
Giraffe IN-BED Scale EU Gravity Zone 16	M1147638
Giraffe IN-BED SCALE EU Uncalibrated	M1125056

7.12.16 Panda scale parts

Table 7-36 Panda scale parts

Part	Part number
Panda IN-BED Scale EU Gravity Zone 1	M1147670
Panda IN-BED Scale EU Gravity Zone 2	M1147687
Panda IN-BED Scale EU Gravity Zone 3	M1147688
Panda IN-BED Scale EU Gravity Zone 4	M1147689
Panda IN-BED Scale EU Gravity Zone 5	M1147690
Panda IN-BED Scale EU Gravity Zone 6	M1147691
Panda IN-BED Scale EU Gravity Zone 7	M1147692
Panda IN-BED Scale EU Gravity Zone 8	M1147693
Panda IN-BED Scale EU Gravity Zone 9	M1147694
Panda IN-BED Scale EU Gravity Zone 10	M1147695
Panda IN-BED Scale EU Gravity Zone 11	M1147696
Panda IN-BED Scale EU Gravity Zone 12	M1147697
Panda IN-BED Scale EU Gravity Zone 13	M1147698
Panda IN-BED Scale EU Gravity Zone 14	M1147699
Panda IN-BED Scale EU Gravity Zone 15	M1147700
Panda IN-BED Scale EU Gravity Zone 16	M1147701
Panda In-bed Scale (North America)	6600-0519-900

7.12.17 Power cords

Table 7-37 Power cords

Part	Part number
FRU KIT, GIRAFFE AND PANDA WARMER, CE POWER CORD AND BRACKET	M111105-2
FRU KIT, GIRAFFE AND PANDA WARMER, NORTH AMERICAN POWER CORD AND BRACKET	M111111-2
FRU KIT, GIRAFFE AND PANDA WARMER, UK POWER CORD AND BRACKET	M111107-2
FRU KIT, GIRAFFE AND PANDA WARMER, AUSTRALIAN POWER CORD AND BRACKET	M111102-2
FRU KIT, GIRAFFE AND PANDA WARMER, ITALIAN POWER CORD AND BRACKET	M111110-2
FRU KIT, GIRAFFE AND PANDA WARMER, SWISS POWER CORD AND BRACKET	M111113-2
FRU KIT, GIRAFFE AND PANDA WARMER, DANISH POWER CORD AND BRACKET	M111106-2
FRU KIT, GIRAFFE AND PANDA WARMER, CHINESE POWER CORD AND BRACKET	M111104-2
FRU KIT, GIRAFFE AND PANDA WARMER, INDIA POWER CORD AND BRACKET	M111108-2
FRU KIT, GIRAFFE AND PANDA WARMER, ISRAEL POWER CORD AND BRACKET	M111109-2
FRU KIT, GIRAFFE AND PANDA WARMER, SOUTH AFRICAN POWER CORD AND BRACKET	M111112-2
Power Cord 230V with NEMA Plug/Philippine	M1194543

7.13 Labels

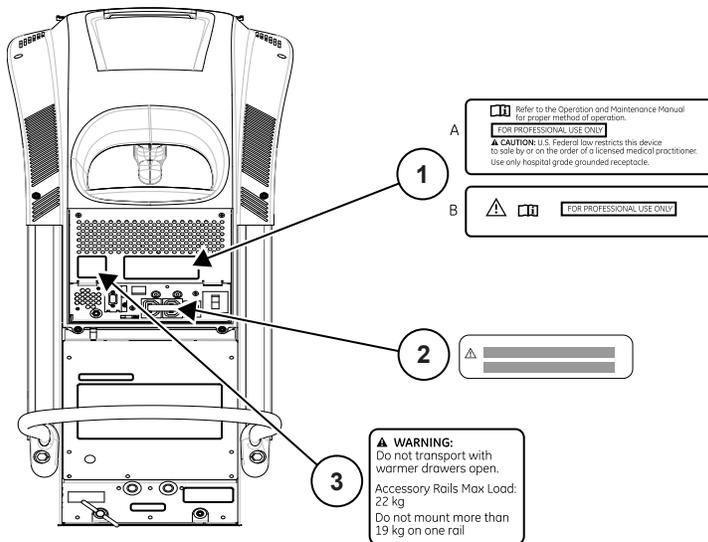
The following labels shown are for illustration purposes only. The content on the labels shown here may be slightly different from the content of the actual labels on the system.

Table 7-38 Labels

Description	Part number
STICKER, LBL SERIAL NUMBER OVERLAY WRM	M1110849
STICKER, LBL SET BRANDING Panda WARMER	M1111360
STICKER, LABEL SET BRANDING GIRAFFE WARMER	M1111366
STICKER, Din Rail Weight Limit 3 kg	M1137000

7.13.1 Labels on the back of Giraffe Warmers or Panda iRes Warmers

Figure 7-19 Labels on the back of the warmer



Call out	Label	Description	Part number	Procedure
1	Rx/Professional Use Label Set	STICKER, RX CAUTION/WRN LBL ENGLISH	M1111331	1. Install either Label A (for US only) or Label B (for all other countries). 2. Discard extra label.
2	Accessory Load Label	STICKER, LBL ACCESSORY LOAD WRM	M1110852	N/A
3	Rail Loading/Tilt Warning	STICKER, Warning - Rail Loading	M1128585	1. Choose appropriate language labels. 2. Install 1 label as shown. 3. Discard extra label.

7.13.2 Heater grille accessory warning label set (bedded only)

1. Choose appropriate language labels (each language will have 2 identical labels).
2. Install 1 label on each side of the heater assembly.
3. Discard extra labels.

Figure 7-20 Heater grille accessory warning label set

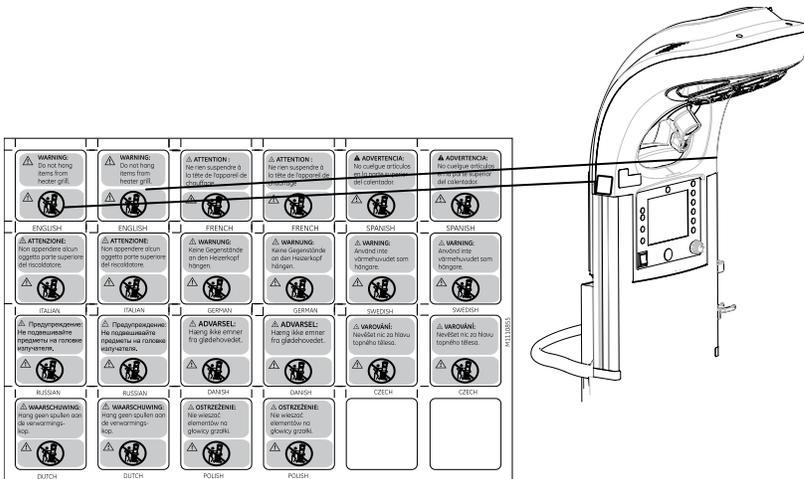
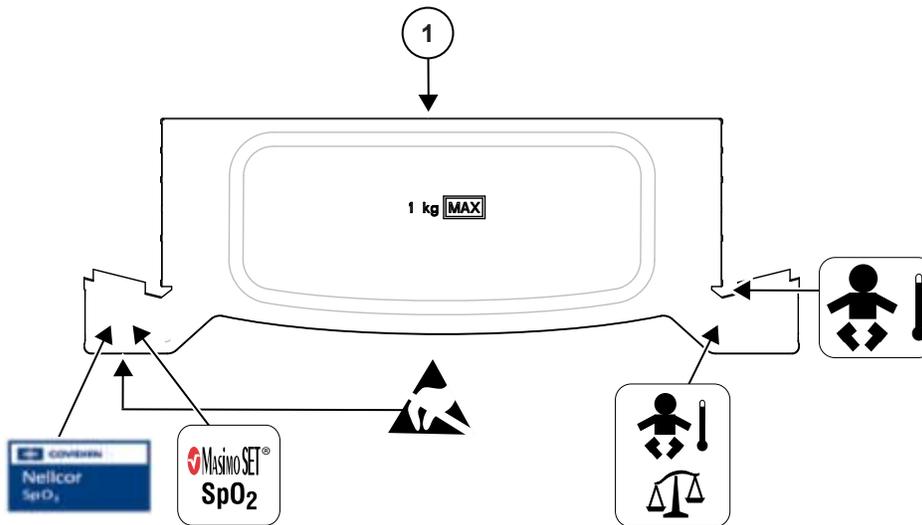


Table 7-39 Heater grille accessory warning label set

Description	Part number
STICKER, LBL SET WARNING HEATER GIRAFFE WRM	M1110855

7.13.3 Labels on probe panel housing

Figure 7-21 Label locations on probe panel housing



1	Patent labels
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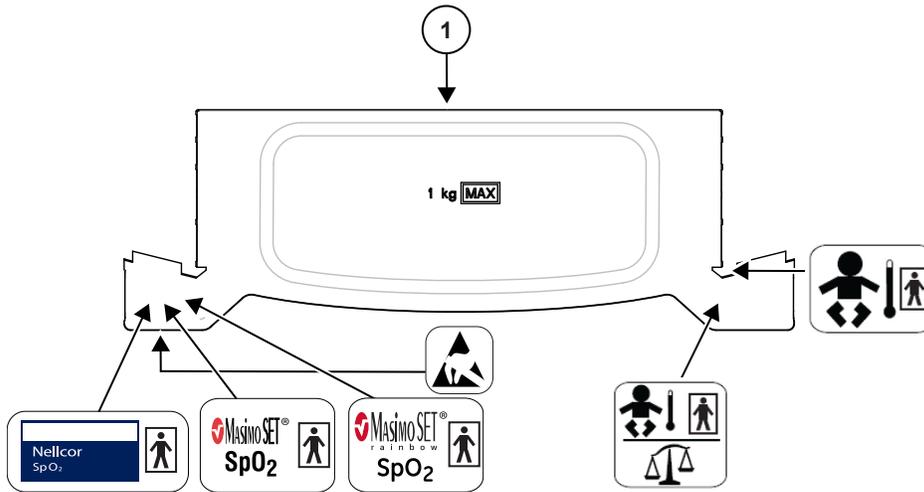
Table 7-40 Probe panel labels

Description	Part number
LBL SET PROBE PANEL GIRAFFE WARMER (Includes all labels shown in Figure 7-21 Label locations on probe panel housing on page 218 except patent labels)	M1079019
LBL NELLCOR PATENT GP WRM	M1217648
LBL PATENT MASIMO MX GP WARMER	M1217559
LBL PATENT MASIMO GP WARMER	M1125258

7.13.4 Labels on probe panel housing of Panda iRes Warmers with ResusView Heart Rate option

Because of individual connector labeling, the rating label for the Panda iRes Warmer ResusView Heart Rate option does not have a Type BF applied part symbol.

Figure 7-22 ResusView Heart Rate option label locations on probe panel housing



1	Patent labels
---	---------------

Table 7-41 Probe panel labels on warmer with ResusView Heart Rate option

Description	Part number
LBL PROBE PANEL TYPE BF HEARTRATE WARMER (Includes all labels shown in Figure 7-22 ResusView Heart Rate option label locations on probe panel housing on page 219 except patent labels. For a list of patent labels, see Table 7-40 Probe panel labels on page 218.)	2103672-001

7.13.5 Control panel labels

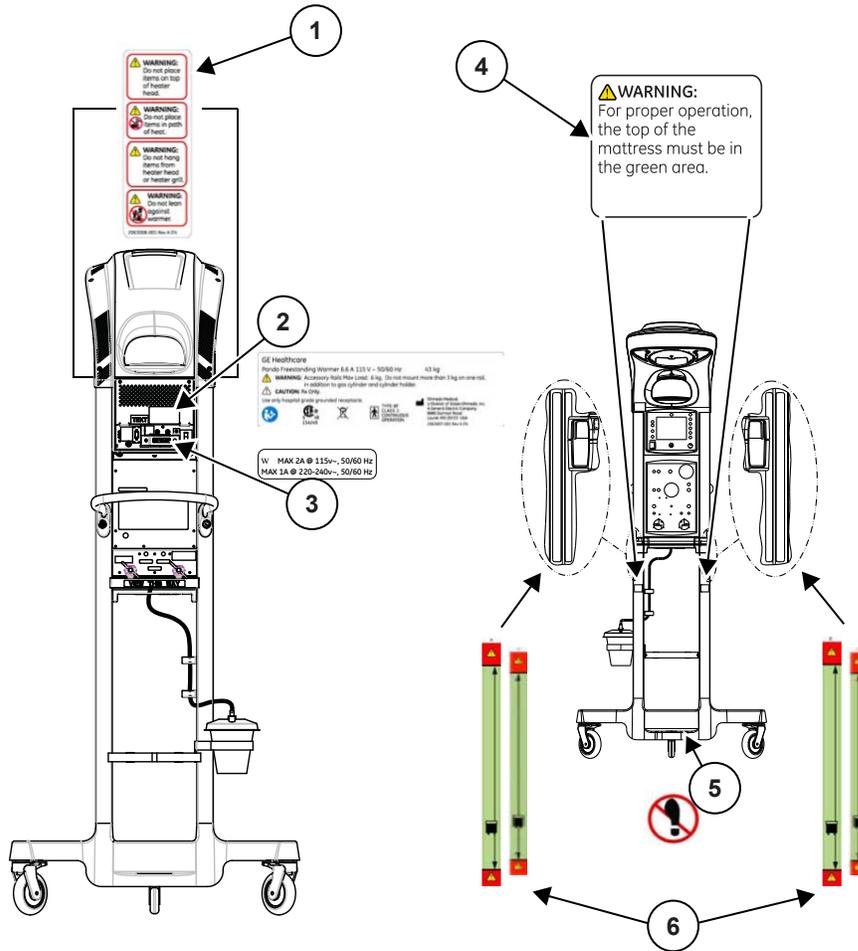
Not shown in [Figure 1-6 Control panel and control panel screen on page 27](#)

Table 7-42 Control panel labels

Sample label	Description	Part number
	LBL Masimo SET Logo (SpO2 option)	M1127486
	LBL NELLCOR LOGO GP WARMER (SpO2 option)	M1217650
	LBL LOGO HEARTRATE WARMER (Panda iRes Warmer with ResusView Heart Rate (HR) option)	2103673-001

7.13.6 Labels on freestanding model

Figure 7-23 Labels on freestanding model



1	Heater head warning label (see Table 7-43 Freestanding labels on page 220)
2	Rating label (see Table 7-43 Freestanding labels on page 220)
3	Accessory load label (M1110852)
4	Mattress height warning label, to be placed below the front mattress height label on each side (see Table 7-43 Freestanding labels on page 220)
5	Do Not Step label (M1157011)
6	Mattress height label, to be placed 1 on each side back and 1 on each side side (2062951-001)

NOTE

When replacing the mattress height labels on the rails, make sure the bottom bar of the labels (indicating the minimum height) is at 32 inch \pm 0.1 inch (81.30 cm \pm 0.25 cm) from the floor.

Table 7-43 Freestanding labels

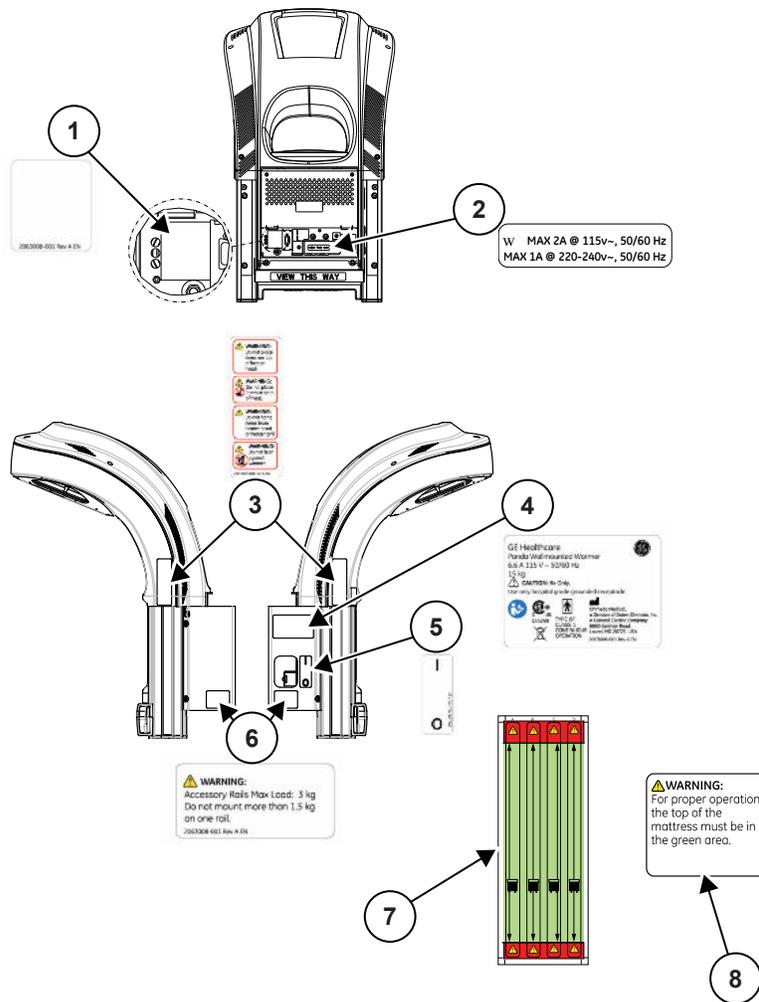
Description	Part number
Freestanding label set, USA	2063007-001

Table 7-43 Freestanding labels (Table continued)

Description	Part number
Freestanding label set, French	2063007-003
Freestanding label set, Spanish	2063007-004
Freestanding label set, German	2063007-005
Freestanding label set, Italian	2063007-006
Freestanding label set, Swedish	2063007-007
Freestanding label set, Russian	2063007-009
Freestanding label set, Greek	2063007-010
Freestanding label set, Dutch	2063007-011
Freestanding label set, Portuguese	2063007-012
Freestanding label set, Danish	2063007-013
Freestanding label set, Finnish	2063007-014
Freestanding label set, Turkish	2063007-015
Freestanding label set, Polish	2063007-016
Freestanding label set, Norwegian	2063007-018
Freestanding label set, Czech	2063007-019
Freestanding label set, Estonian	2063007-020
Freestanding label set, Hungarian	2063007-021
Freestanding label set, Bulgarian	2063007-022
Freestanding label set, Lithuanian	2063007-023
Freestanding label set, Romanian	2063007-024
Freestanding label set, Slovakian	2063007-026
Freestanding label set, Croatian	2063007-027
Freestanding label set, Indonesian	2063007-028
Freestanding label set, Serbian	2063007-029

7.13.7 Labels on wall mount model

Figure 7-24 Labels on wall mount model



1	Speaker baffling (see Table 7-44 Wall mount labels on page 223)
2	Accessory load label (M1110852)
3	Heater head warning label (See Table 7-44 Wall mount labels on page 223)
4	Rating Label (see Table 7-44 Wall mount labels on page 223)
5	Breaker ON/OFF (see Table 7-44 Wall mount labels on page 223)
6	Rail load label (see Table 7-44 Wall mount labels on page 223)
7	Mattress height label, only 1 label to be placed on the wall (2062951-001)
8	Mattress height warning label, 1 label to be placed on the wall next to mattress height label (2070456-001)

NOTE

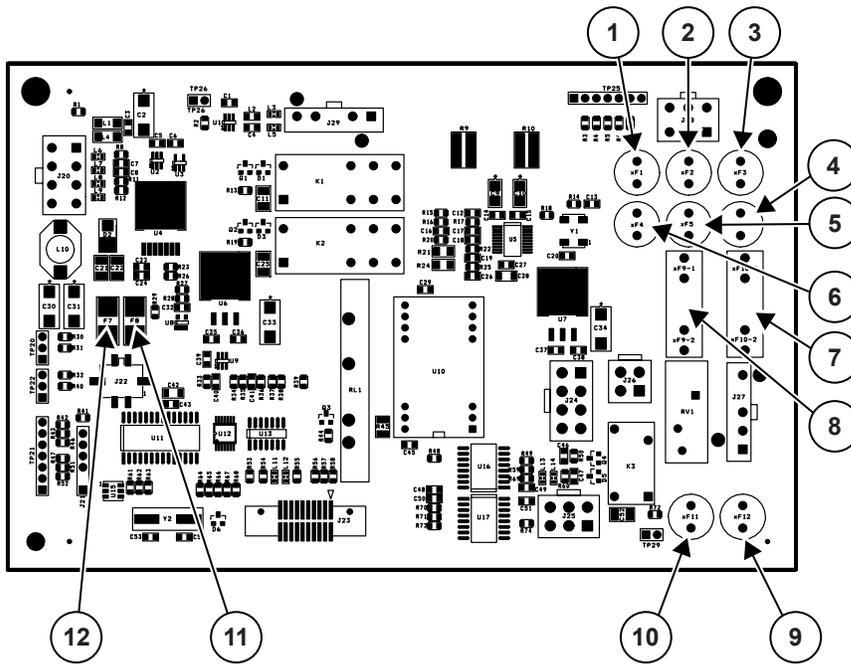
When installing the mattress height label on the wall, place the bottom bar of the label (indicating the minimum height) at 32 inch \pm 0.1 inch (81.30 cm \pm 0.25 cm) from the floor and vertically center align the label with the center of the warmer head. See [Figure 3-7 Mattress height label installation on page 71](#).

Table 7-44 Wall mount labels

Description	Part number
Wall Mount label set, USA	2063008-001
Wall Mount label set, English INTL	2063008-002
Wall Mount label set, French	2063008-003
Wall Mount label set, Spanish	2063008-004
Wall Mount label set, German	2063008-005
Wall Mount label set, Italian	2063008-006
Wall Mount label set, Swedish	2063008-007
Wall Mount label set, Japanese	2063008-008
Wall Mount label set, Russian	2063008-009
Wall Mount label set, Greek	2063008-010
Wall Mount label set, Dutch	2063008-011
Wall Mount label set, Portuguese	2063008-012
Wall Mount label set, Danish	2063008-013
Wall Mount label set, Finnish	2063008-014
Wall Mount label set, Turkish	2063008-015
Wall Mount label set, Polish	2063008-016
Wall Mount label set, Chinese	2063008-017
Wall Mount label set, Norwegian	2063008-018
Wall Mount label set, Czech	2063008-019
Wall Mount label set, Estonian	2063008-020
Wall Mount label set, Hungarian	2063008-021
Wall Mount label set, Bulgarian	2063008-022
Wall Mount label set, Lithuanian	2063008-023
Wall Mount label set, Romanian	2063008-024
Wall Mount label set, Korean	2063008-025
Wall Mount label set, Slovakian	2063008-026
Wall Mount label set, Croatian	2063008-027
Wall Mount label set, Indonesian	2063008-028

7.14 Board layouts

Figure 7-25 Power board (2065768-001)



1	F1
2	F2
3	F3
4	F6
5	F5
6	F4
7	F10
8	F9
9	F12
10	F11
11	F8
12	F7

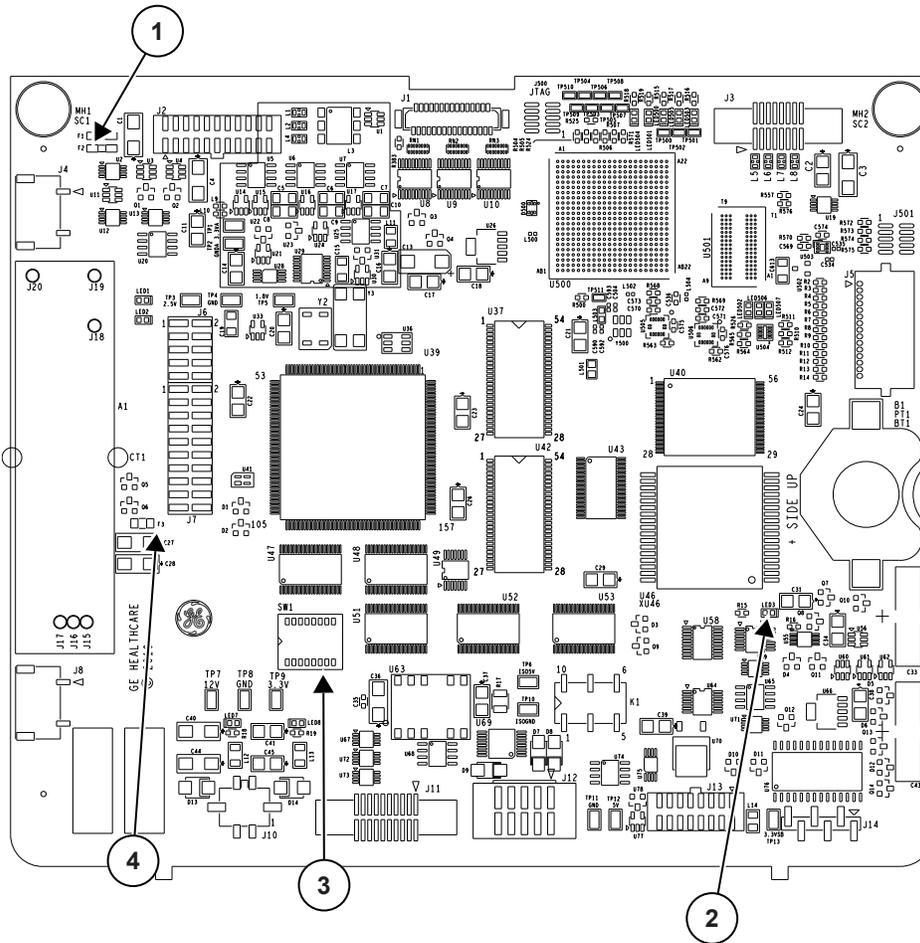
Table 7-45

	Fuse
FUSE SUBMINI 3.15A HIGH BRK	F2, F3, F5, F6
FUSE, 2A, 125V, SMD, fast acting, socketed	F7, F8
6.3A 250V TIME LAG	F9, F10
FUSE, Submini 2A	F1, F4, F11, F12

NOTE

Fuse kit (M1118329) includes 3.15 A 250 V (10 pieces), 2A 250 V (10 pieces), 6.3A 250 V (5 pieces), 2A 125 V (5 pieces).

Figure 7-26 Control board (2065760-001)



1	Self-resetting over current protection PTCs for Scale, HR, and SpO2
2	LED 3: ON=Charging, OFF=Not Charging, Flashing = Charging Error
3	Dipswitches
4	Non-replaceable fuse for backlight inverter

7.15 Test points

The DC voltage generated on control and power PCAs shall meet the following requirements:

- The following are derived from the 3.3V input voltage: 1.8V ± 3%, 2.5V ± 2%, 3.3V+0.2V/-0V.
- The following are derived from the 12V input voltage: ISO5V ± 5%, 5.0V ± 4%, 3.3VSTBY ± 2%, 12V ± 5%, 5V -ni ± 5%.

7.15.1 Control board

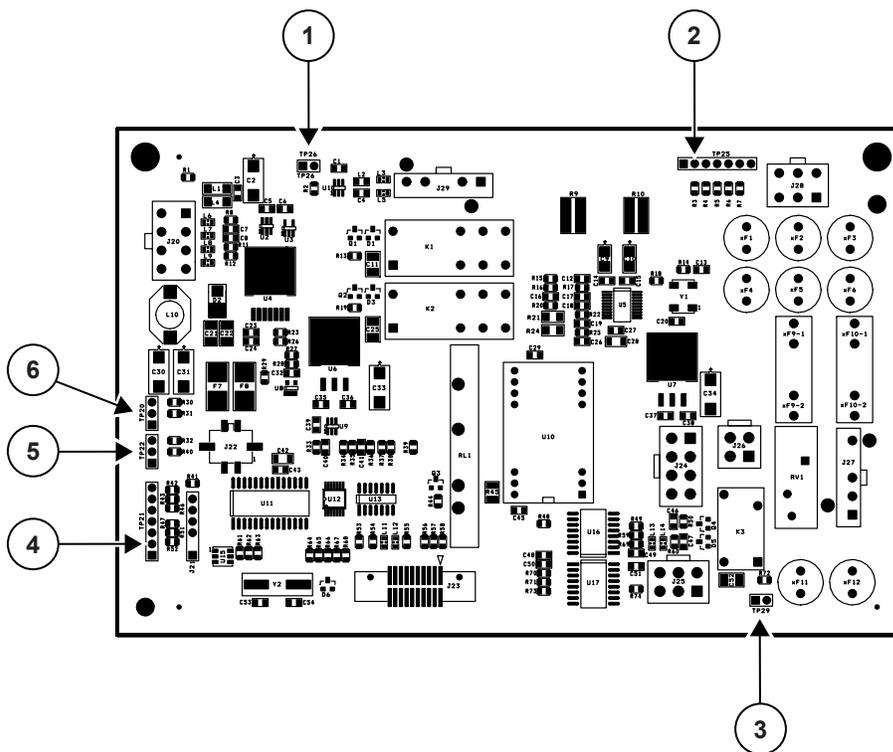
The appearance of your board may differ, but all functionality remains the same.

Table 7-46 (Table continued)

TP	Value
8	Ground (digital)
9	+3.3V (digital)
11	Ground (digital)
12	+5V (digital)
13	+3.3V (standby)

7.15.2 Power board

Figure 7-28 Power board test points



1	TP 26
2	TP 25 Pin 1
3	TP 29
4	TP 21 Pin 1
5	TP 22
6	TP 20

Table 7-47

TP	Value
20-1	Ground (DC)
20-2	+5V

Table 7-47 (Table continued)

TP	Value
20-3	+12V
22-1	Ground (DC)
22-2	+3.3V
22-3	+12V
25-1	Ground AC side (not connected to earth)
25-7	5V - ni

Chapter 8 Parts replacement

8.1 Parts replacement safety

**CAUTION**

PERSONNEL INJURY HAZARD

Make sure the caster brakes are locked before you do a service procedure.

Always perform checkout procedures after doing any repair, replacement, or calibration and before putting the device back into use.

8.2 Heater head removal from wall bracket (wall mount only)

Tools required

4 mm hex key

Time required

15 minutes

See [Figure 7-16 Wall mount model \(exploded view\)](#) on page 200.

**WARNING**

BURN HAZARD

Do not touch the grill, heater, heat engine, exhaust duct, lamp, or adjacent areas during and immediately after operation.

These parts are sufficiently hot to burn skin.

Disconnect power to the device and wait until the parts are cool before you touch them.

For wall-mounted warmer models, remove the heater head from the wall bracket for access to the rear side of the device for repairs.

1. Use a 4 mm hex key to remove the 4 M6 button-head screws that attach the heater head to the wall bracket. Do not remove the shoulder screws.
2. Lift the heater head to release the shoulder screws from the bracket slots and remove the head from the bracket.
3. Put the heater head on a flat surface with the grill side down.

8.3 Heater housing repairs

Do not cross thread or tighten the captive screws too much.

For easier access to the heater housing during repairs, lower the warmer bed to its lowest position.
After removing parts, do the procedures in reverse sequence to install the parts again.

WARNING



BURN HAZARD

Do not touch the grill, heater, heat engine, exhaust duct, lamp, or adjacent areas during and immediately after operation.

These parts are sufficiently hot to burn skin.

Disconnect power to the device and wait until the parts are cool before you touch them.

8.3.1 Upper heater housing removal

Tools required

3 mm hex key

Time required

20 minutes

CAUTION

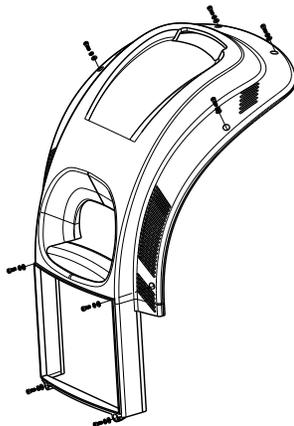


PATIENT INJURY HAZARD - HYPOTHERMIA

Do not touch the inner surface of the heater reflector. Skin oil can decrease the heater output by decreasing the reflectivity of the reflector surface.

1. For wall-mounted models, remove the heater head from the wall bracket. See [8.2 Heater head removal from wall bracket \(wall mount only\)](#) on page 229.
2. Use a 3 mm hex key to remove the 8 socket-head screws, ring washers, and flat washers that secure the upper heater housing to the lower heater housing.

Figure 8-1 Upper heater housing screws



3. Remove the upper heater housing:
 - a. Lift the upper heater housing from its top, front edge.

- b. Remove the upper heater housing for access to the heat engine, heater protective grill, power supplies, and alarm light board (non-IEC compliant devices) or indicator light board (IEC compliant devices).
4. To re-install the upper heater housing, put the upper heater housing on the lower heater housing.
 - a. Make sure that the upper heater housing is secure.
 - b. Tighten the screws from the bottom up, with the lowest screws first and the highest screws last.

8.3.2 Heat engine assembly removal

Tools required

- 3 mm hex key
- Small straight screwdriver
- 6 mm nut driver
- Wire cutter
- Socket wrench
- Pliers

Time required

1 hour and 30 minutes



See [Figure 7-2 Heater engine](#) on page 171.

1. 2 of the screws that secure the duct are behind the power supply mounting plates. To access the 2 screws behind the power supply mounting plates:

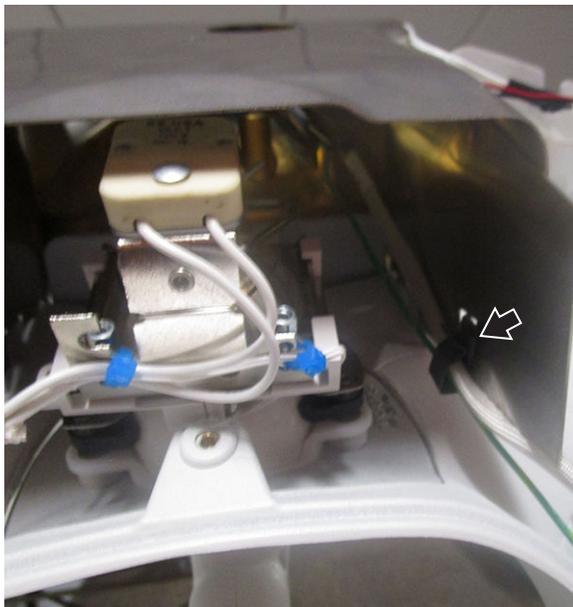
- a. Use a 3 mm hex key to remove the 2 mounting plate screws on each mounting plate. Put the power supplies to the side.

Figure 8-2 Power supply mounting plate screws



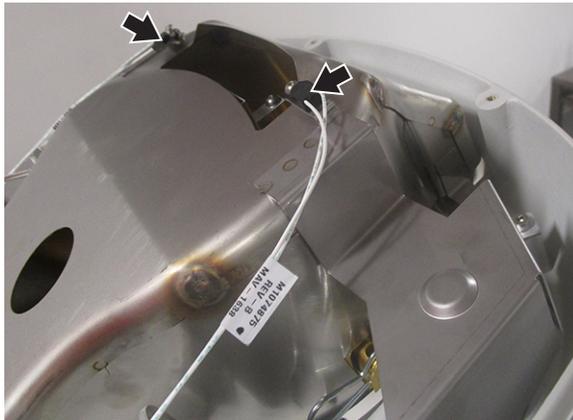
- b. Remove the heat engine wires from the clip.

Figure 8-3 Heat engine wire clip



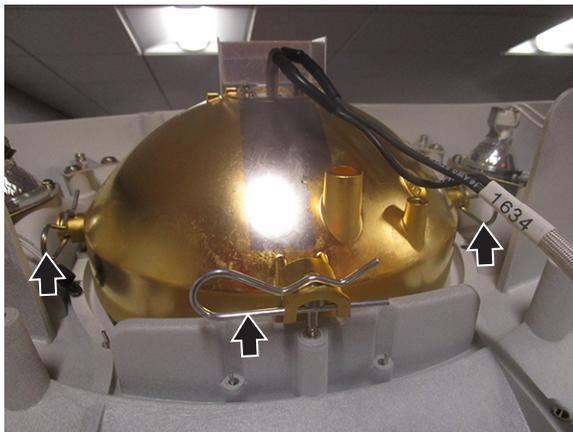
- c. Use a 3 mm hex key to disconnect the 2 thermostats on the exhaust duct.

Figure 8-4 Thermostats



- d. Use a socket wrench to disconnect the ground wire attached near the bottom left of the duct.
2. Use a 3 mm hex key to remove the 6 socket-head screws, split ring washers, and flat washers that secure the exhaust duct to the lower heater housing. See [Figure 8-6 Heater housing – rear view on page 235](#).
3. Remove the duct. If the device has been used recently, the duct can be hot.
4. To remove the heat engine:
 - a. Disconnect the heater power connectors and ground wire.
 - b. Remove the 3 hairpin cotter pins found below each of the heater adjustment screws.

Figure 8-5 Hairpin cotter pins



- c. Remove the assembly.

If necessary, you can cut the safety wires that secure the adjustment screws. These do not need to be replaced.

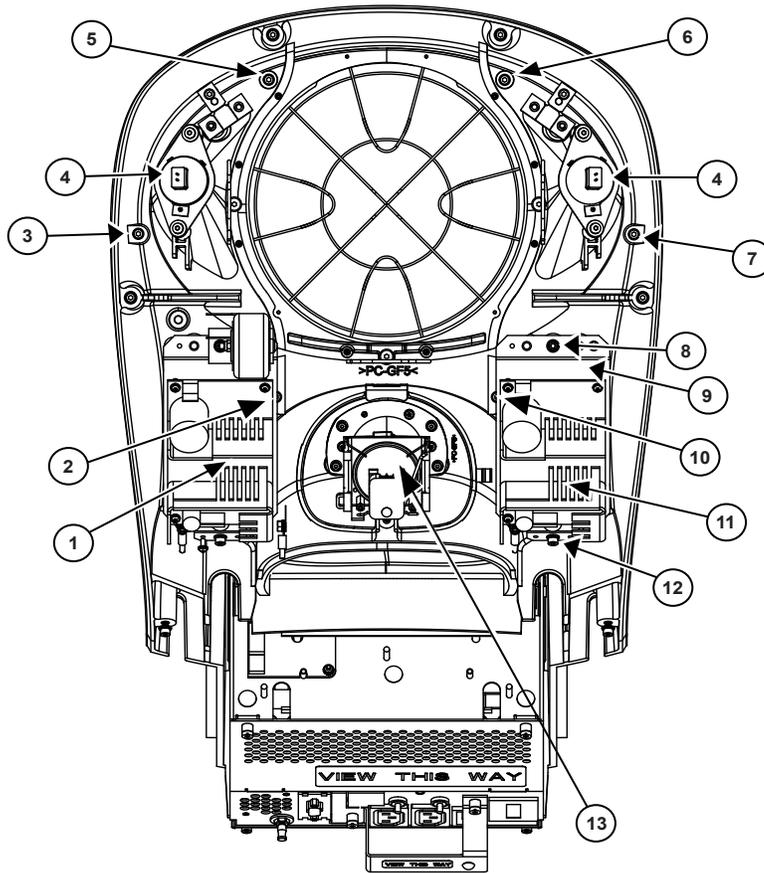
5. To remove the heater protective grill:
 - a. Use a small straight screwdriver to open the 8 clips that hold the grill together.

- b. Push the grill wires down from the top of the device and then pull the wires up again with pliers to make the clips easier to hold with the pliers.

To assemble the grill again, make sure the 2 grill wires that poke through the lower housing on the sides of the duct are on the external side of the duct's edges.

Figure 8-6 Heater housing – rear view

For visibility, [Figure 8-6 Heater housing – rear view on page 235](#) does not show the upper housing, heat engine, and exhaust duct.



1	Procedure light power supply
2	Duct mounting screw 1
3	Duct mounting screw 2
4	Observation light
5	Duct mounting screw 3
6	Duct mounting screw 4
7	Duct mounting screw 5
8	Top mounting screw
9	Power supply mounting plate
10	Duct mounting screw 6
11	Main DC power supply
12	Bottom mounting screw
13	Procedure light

8.3.3 Heater alignment

Tools required

Alignment laser

Laser level (with 2 wall leveling capability) or a combination of T-square and Plumb-bob

Long 3 mm hex key

You must look at the heater alignment after you replace the dovetail rails, lower heater housing, or parts that have an unwanted effect on the distance and angle between the heating element and the center of the bed.

You must also do a heater alignment after the installation of wall-mounted models. When you remove a wall-mounted warmer from the bracket and then install it on the bracket, it is not necessary that you align the heater again.



1. Remove the upper heater housing. See [8.3.1 Upper heater housing removal on page 230](#).
2. Fit the alignment laser into the laser holder. Turn the laser about 1/8 turn to seat it in the bore of the laser holder.
3. For bedded models, remove the mattress, mattress support, translation deck, and x-ray tray (if necessary).

You must remove the mattress and translation deck to see the circle target in the bed's center.

NOTE

Standard laser tool batteries require replacement after approximately 20 minutes of operation.

If the laser dot is in the target area, no further steps are necessary.

4. For freestanding models, lock the device casters and find and mark the alignment point on the floor. The alignment point can be 33 in \pm 0.1 in (84 cm \pm 0.25 cm) distance from the front side of the rails and at 0.75 in \pm 0.1 in (1.9 cm \pm 0.25 cm) distance from the center of the device. See [Figure 8-7 Locating alignment point for freestanding models on page 237](#).

NOTE

Use a laser level (with 2 wall leveling capability) or a combination of T-square and Plumb-bob to find the alignment point on the floor accurately.

5. For wall-mounted models, find and mark the alignment point as shown in [Figure 8-8 Locating alignment point for wall-mounted models used with bassinet on page 238](#) (for installations using a bassinet) or [Figure 8-9 Locating alignment point for wall-mounted model used with a fixed surface on page 239](#) (for installations using a fixed surface).

To use installations with bassinets, the alignment point is 40.5 in \pm 0.1 in (103 cm \pm 0.25 cm) distance from the wall and at 0.75 in \pm 0.1 in (1.9 cm \pm 0.25 cm) distance from the center of the device. See [Figure 8-8 Locating alignment point for wall-mounted models used with bassinet on page 238](#).

To use installations with fixed surfaces, the alignment point is 25.75 in ± 0.1 in (65 cm ± 0.25 cm) distance from the wall in line with the center of the device. See [Figure 8-9 Locating alignment point for wall-mounted model used with a fixed surface on page 239](#).

NOTE

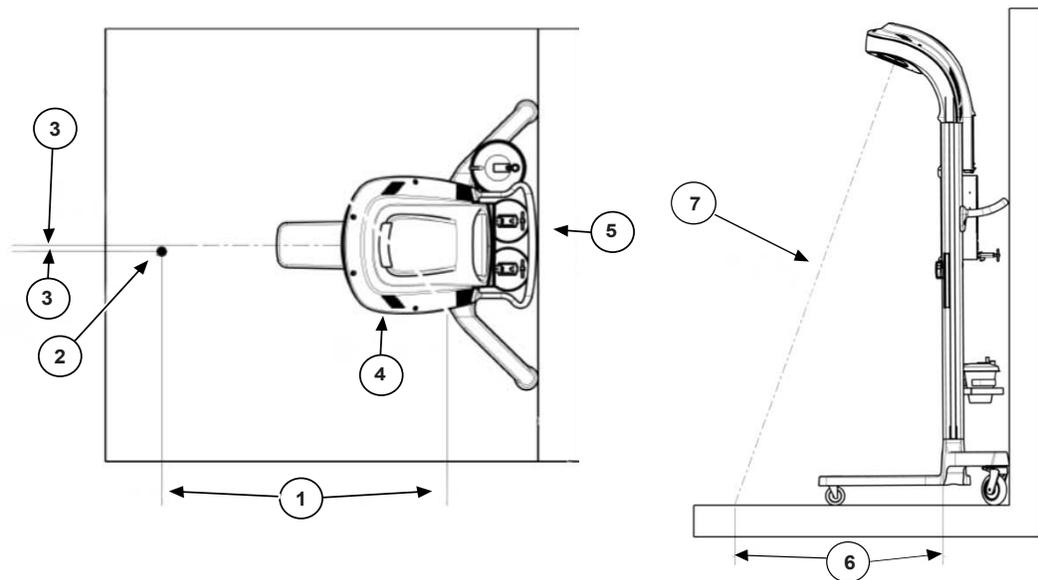
Use a laser level (with 2 wall leveling capability) or a combination of T-square and Plumb-bob to find the alignment point on the floor.

NOTE

Make sure that the alignment point location is measured from the wall, not the baseboard.

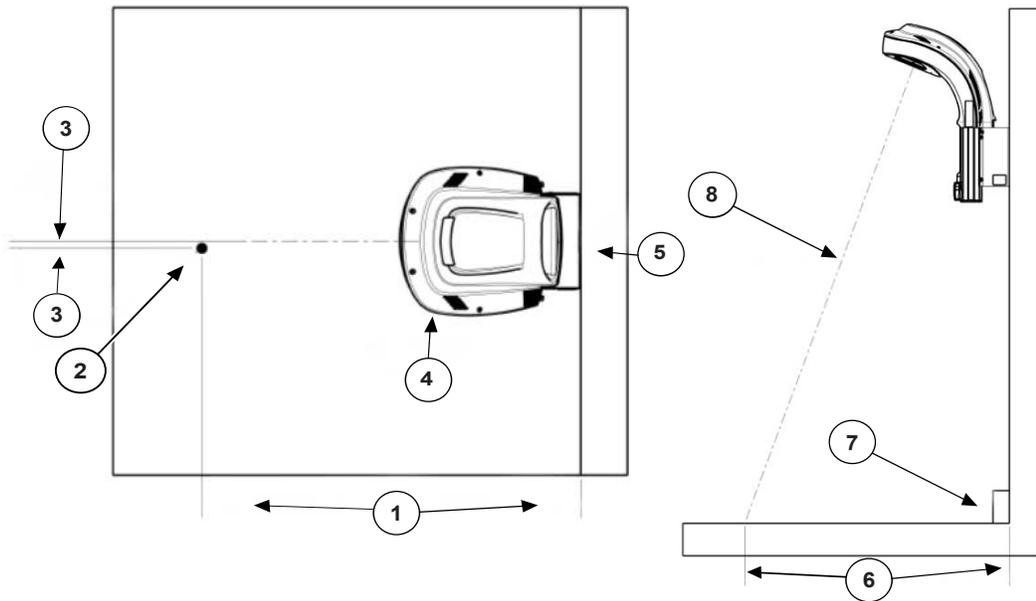
6. Use a long 3 mm hex key to adjust the 3 adjustment screws of the dish. You can find these screws in the bosses below the cotter pins.
7. Loosen or tighten the 2 screws on the sides to move the laser point from left to right, with longitudinal shift, and adjust the screw in the rear. This moves the laser point up and down in the target.
8. Adjust the side screws and then adjust the bottom screw, so that the laser point is near the center of the target circle for bedded models and on the marked alignment point on the floor for freestanding and wall-mounted models.

Figure 8-7 Locating alignment point for freestanding models



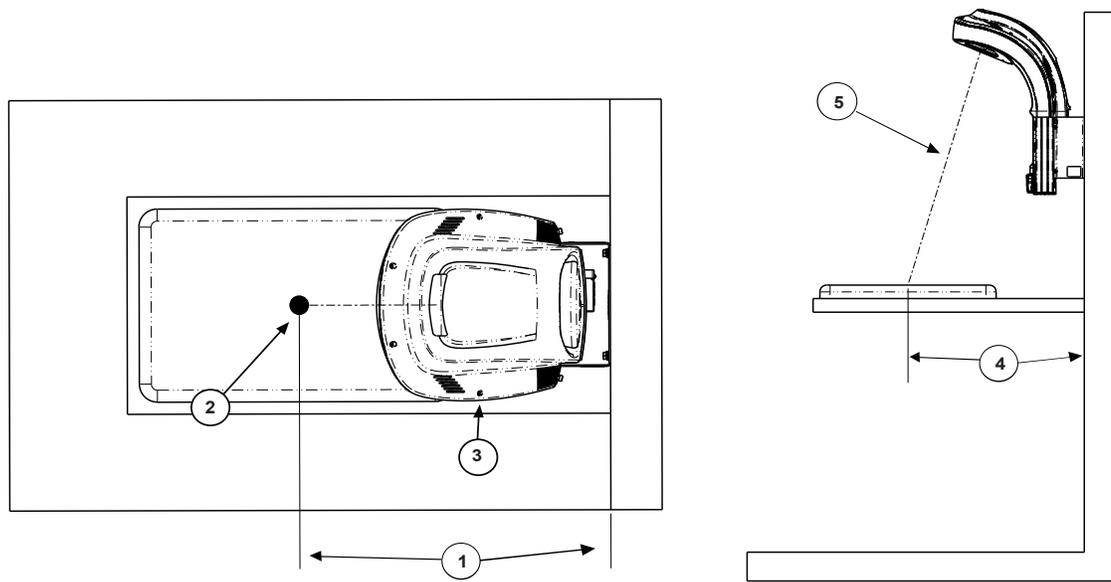
1	33 in ± 0.1 in (84 cm ± 0.25 cm)
2	Alignment point
3	0.75 in ± 0.1 in (1.9 cm ± 0.25 cm)
4	Freestanding device
5	Wall
6	33 in ± 0.1 in (84 cm ± 0.25 cm)
7	Laser beam

Figure 8-8 Locating alignment point for wall-mounted models used with bassinet



1	40.5 in ± 0.1 in (103 cm ± 0.25 cm)
2	Alignment point
3	0.75 in ± 0.1 in (1.9 cm ± 0.25 cm)
4	Wall-mounted device
5	Wall
6	40.5 in ± 0.1 in (103 cm ± 0.25 cm)
7	Base board
8	Laser beam

Figure 8-9 Locating alignment point for wall-mounted model used with a fixed surface



1	25.75 in ± 0.1 in (65 cm ± 0.25 cm)
2	Alignment point
3	Wall-mounted device
4	25.75 in ± 0.1 in (65 cm ± 0.25 cm)
5	Laser beam

8.3.4 Power supply replacement

Tools required

- 2 mm hex key
- 7 mm socket wrench
- 3 mm hex key

Parts required

- Replacement power supply

Time required

- 30 minutes

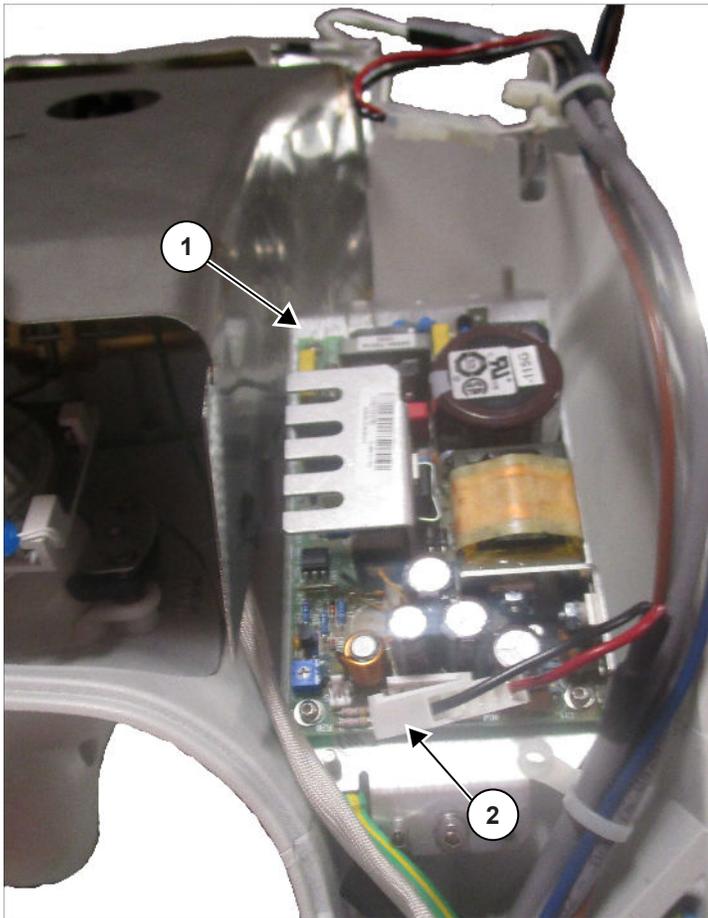


There are 2 power supplies, 1 on each side of the heater head.

1. Remove the upper heater housing. See [8.3.1 Upper heater housing removal on page 230](#).

2. Disconnect the electrical connectors of the power supply.

Figure 8-10 Electrical connectors of the power supply



1	Power supply
2	Electrical connectors disconnected

- Use a 2 mm hex key to disconnect the wire ties from the power supply mounting plate.

Figure 8-11 Wire ties



1	Wire ties
2	Power supply mounting plate

- Use a 7 mm socket wrench to disconnect the ground wire from the bracket.

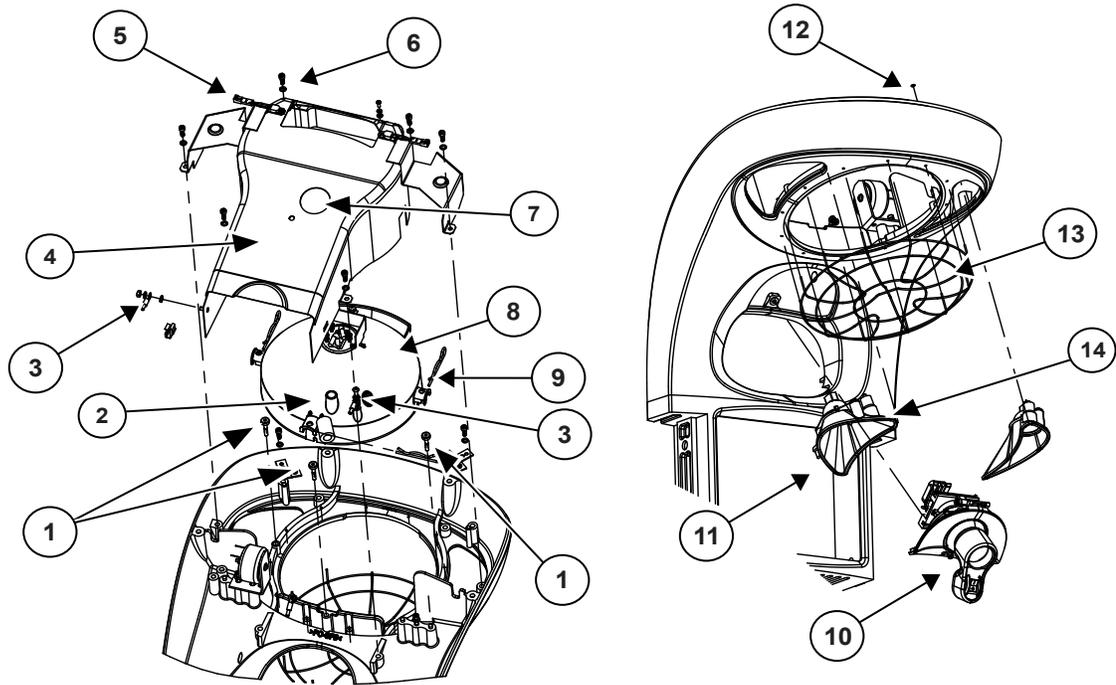
Figure 8-12 Ground wire



- Use a 3 mm hex key to remove the power supply bracket mounting screws if not already done.
- Remove the power supply/bracket assembly and put it on a working surface.

- Use a 2 mm hex key to remove the 4 screws and remove the power supply.

Figure 8-13 Heat engine assembly and lights



1	Adjustment screws
2	Laser mounting hole
3	Ground wire
4	Exhaust duct
5	Thermostat
6	Duct mounting screw
7	Laser access hole
8	Heater dish
9	Cotter pin
10	Procedure light assembly
11	Observation light tunnel
12	Grill mounting clip
13	Protective grill
14	Observation light bulb

8.3.5 Alarm light board or indicator light board replacement

Tools required

- 3 mm hex key
- 2 mm hex key

Parts required

Replacement alarm light board or indicator light board

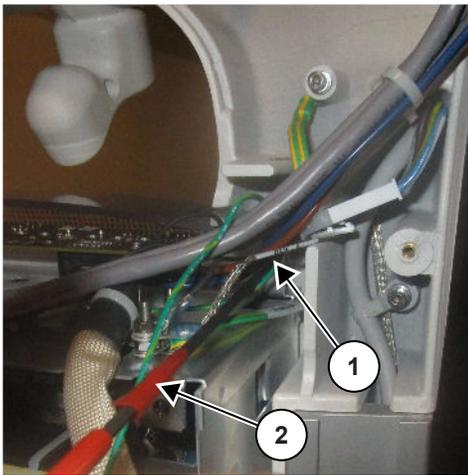
Time required

40 minutes



1. Remove the upper heater housing. See [8.3.1 Upper heater housing removal on page 230](#).
2. Use a 3 mm hex key to remove the 2 captive screws that secure the electronics enclosure on the sides of the lens.

Figure 8-14 Captive screws

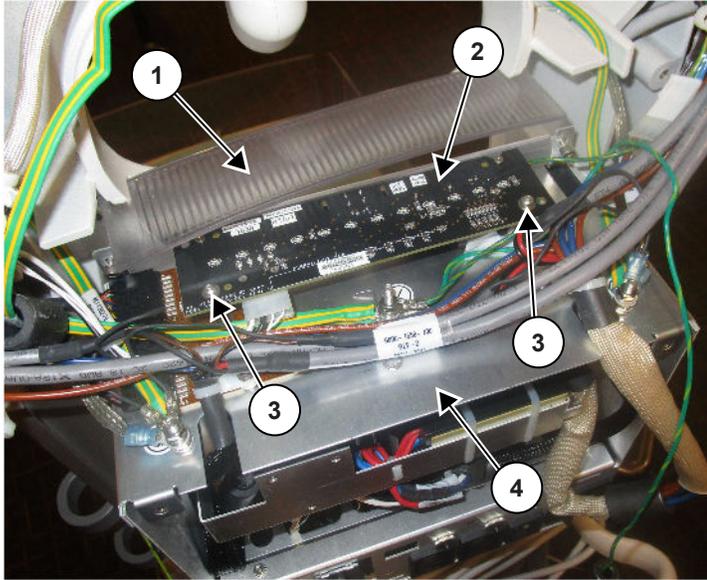


1	Captive screw
2	3 mm hex key

3. Tilt the top of the electronics enclosure out to access the screws that secure the back of the alarm light board (non-IEC compliant devices) or indicator light board (IEC compliant devices).

4. To remove the alarm light board or indicator light board, use a 2 mm hex key to remove the 2 screws that secure the alarm light board or indicator light board to the electronics enclosure.

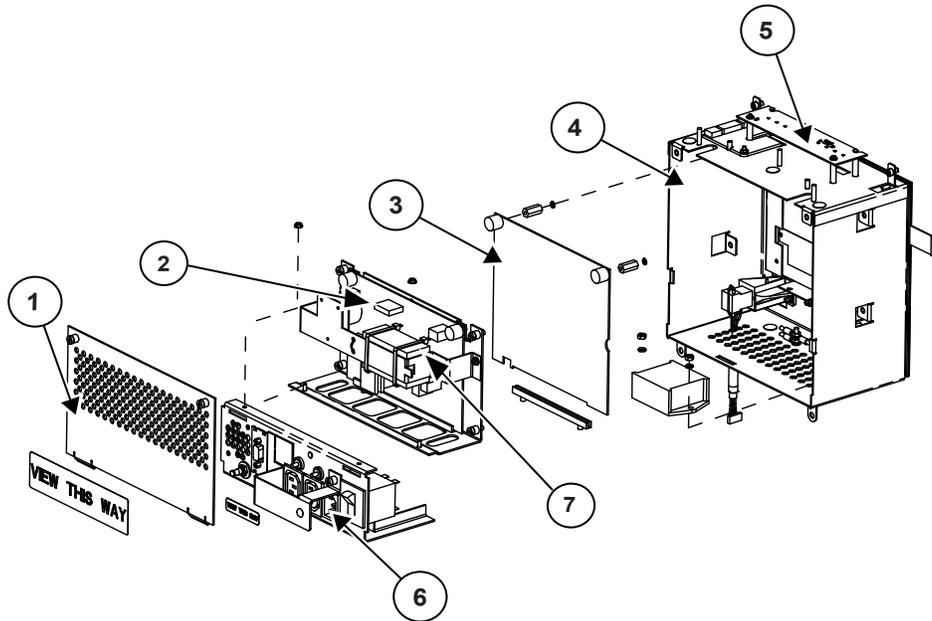
Figure 8-15 Alarm light board or indicator light board



1	Lens
2	Alarm light board or indicator light board
3	Screws
4	Electronics enclosure

5. Disconnect the electrical connectors.
6. To replace the alarm light board or indicator light board, connect the ribbon cable again.
When installed, the LEDs are located on the bottom of the board.

Figure 8-16 Electronics enclosure disassembly



1	Enclosure rear panel
2	Power board
3	Control board
4	Electronics enclosure
5	Alarm light board or indicator light board
6	Outlet panel
7	Observation halogen light transformer

8.3.6 Replacing an observation light bulb

Tools required

Straight-edge screwdriver

Parts required

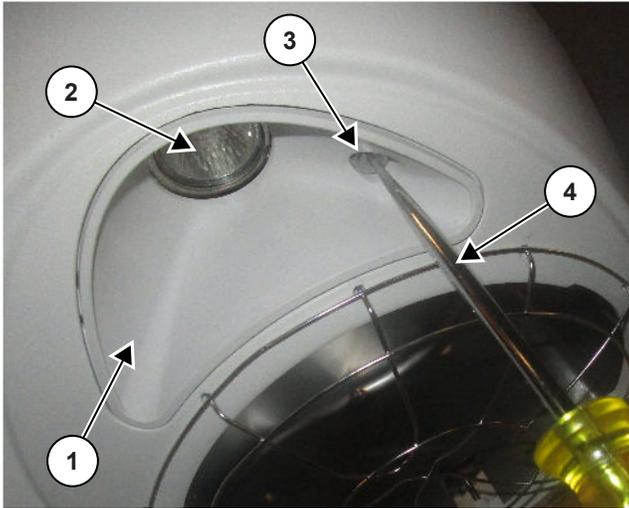
Replacement observation light bulb

Time required

10 minutes

1. Use a straight-edge screwdriver to remove the screw that attaches the light tunnel to the lower heater housing.

Figure 8-17 Light tunnel screw

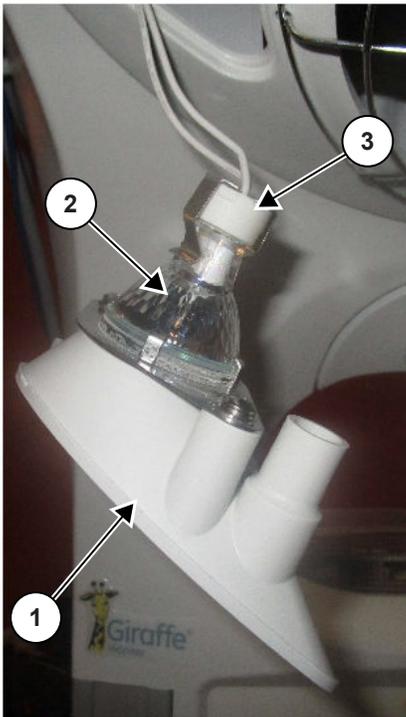


1	Light tunnel
2	Observation light bulb
3	Screw
4	Straight-edge screwdriver

2. Tilt the tunnel forward and remove the light tunnel from the housing.

3. Disconnect the electrical connector of the observation light bulb.

Figure 8-18 Electrical connector



1	Light tunnel
2	Observation light bulb
3	Electrical connector

4. Remove the observation light bulb from its spring retainer.

Figure 8-19 Spring retainer



5. Replace the observation light bulb. Confirm that the glass lens is aligned.

8.3.7 Replacing the procedure light bulb

Tools required

3 mm hex key

Parts required

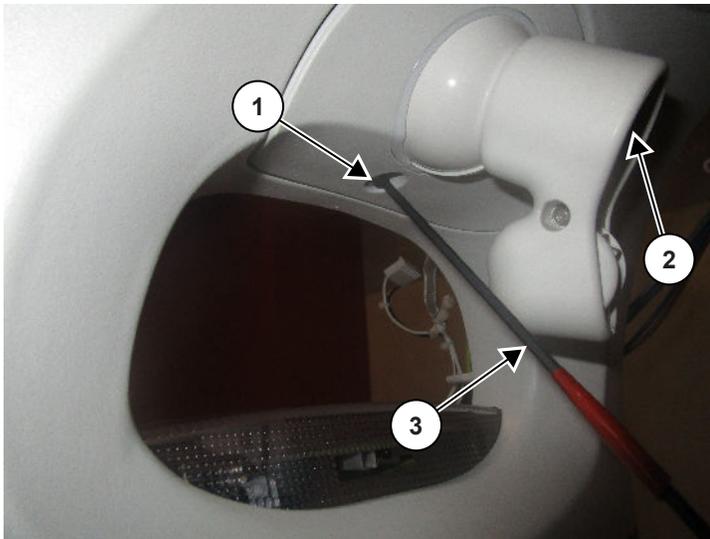
Replacement procedure light bulb

Time required

10 minutes

1. Use a 3 mm hex key to remove the socket head screw that holds the procedure light.

Figure 8-20 Socket head screw

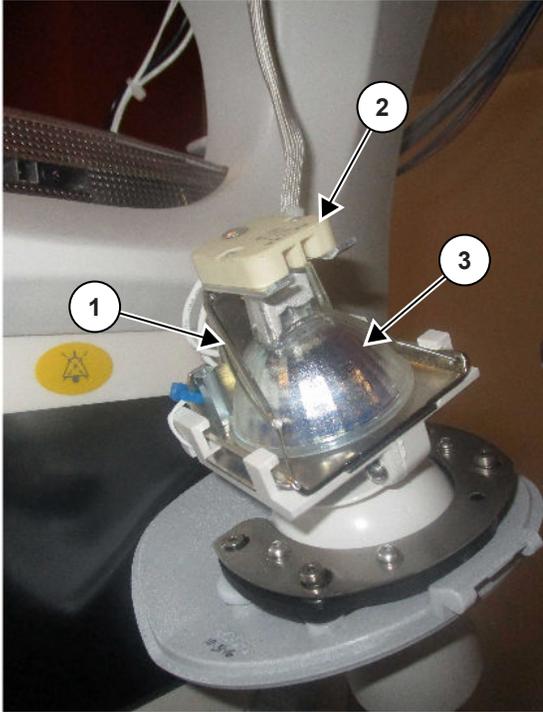


1	Socket head screw
2	Procedure light
3	3 mm hex key

The lamp then hangs by its wires.

2. Push the lever arm of the spring clip to eject the procedure light bulb from its holder.

Figure 8-21 Lever arm



1	Lever arm
2	Holder
3	Procedure light bulb

Before you install the procedure light bulb, move the lever to its initial position.

8.4 Electronic enclosure repairs



Do not cross thread or tighten the screws too much.

After removing parts, do the procedures in reverse sequence to install the parts again.

8.4.1 Power board

Tools required

- Phillips-head screwdriver
- 5.5 mm socket wrench

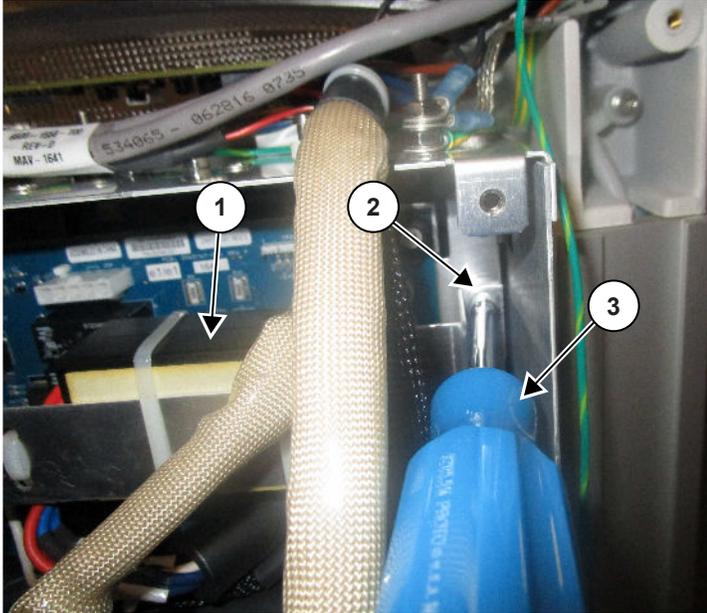
Time required

20 minutes

See [Figure 8-16 Electronics enclosure disassembly on page 245](#) and [Figure 8-26 Power board panel on page 253](#).

1. For wall-mounted models, remove the heater head from the wall bracket. See [8.2 Heater head removal from wall bracket \(wall mount only\) on page 229](#).
2. Use a phillips-head screwdriver to loosen the 2 captive screws at the top of the rear panel of the enclosure.
3. Tilt the panel down and lift the 2 tabs at the bottom of the panel up out of the slots.
4. Use a 5.5 mm socket wrench to remove 2 KEPS nuts that secure the observation light transformer.

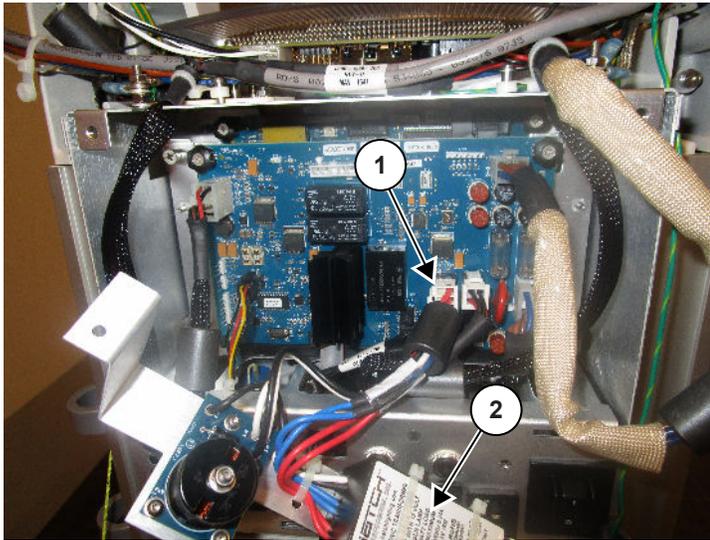
Figure 8-22 KEPS nut



1	Observation light transformer
2	KEPS nut
3	5.5 mm socket wrench

5. Remove the observation light transformer and disconnect the electrical connector.

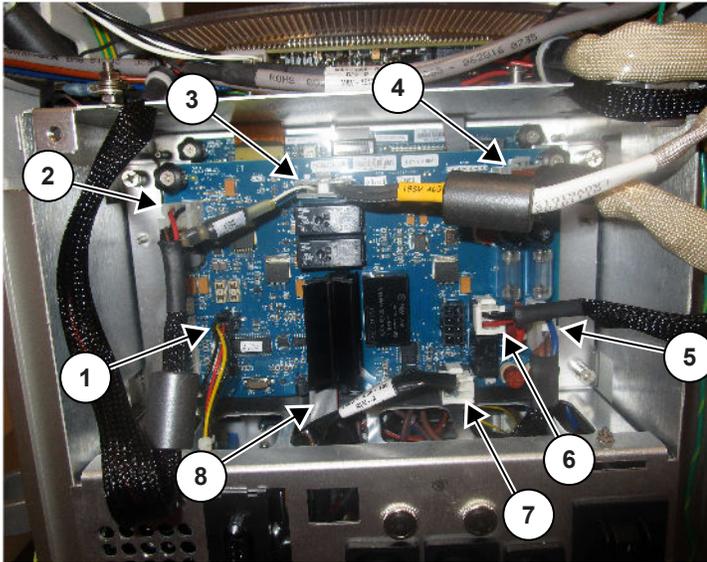
Figure 8-23 Electrical connector of the observation light transformer



1	Electrical connector
2	Observation light transformer

- Disconnect the ribbon cable and the 8 electrical connectors of the power board.

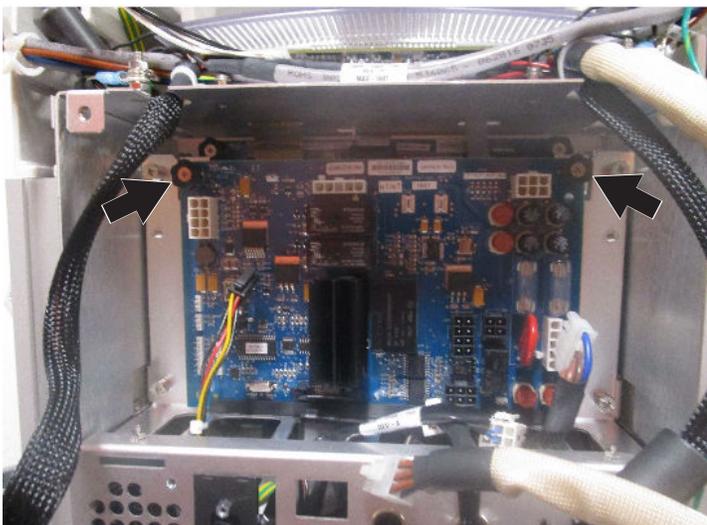
Figure 8-24 Electrical connectors of the power board



1	Electrical connector 1
2	Electrical connector 2
3	Electrical connector 3
4	Electrical connector 4
5	Electrical connector 5
6	Electrical connector 6
7	Electrical connector 7
8	Ribbon cable

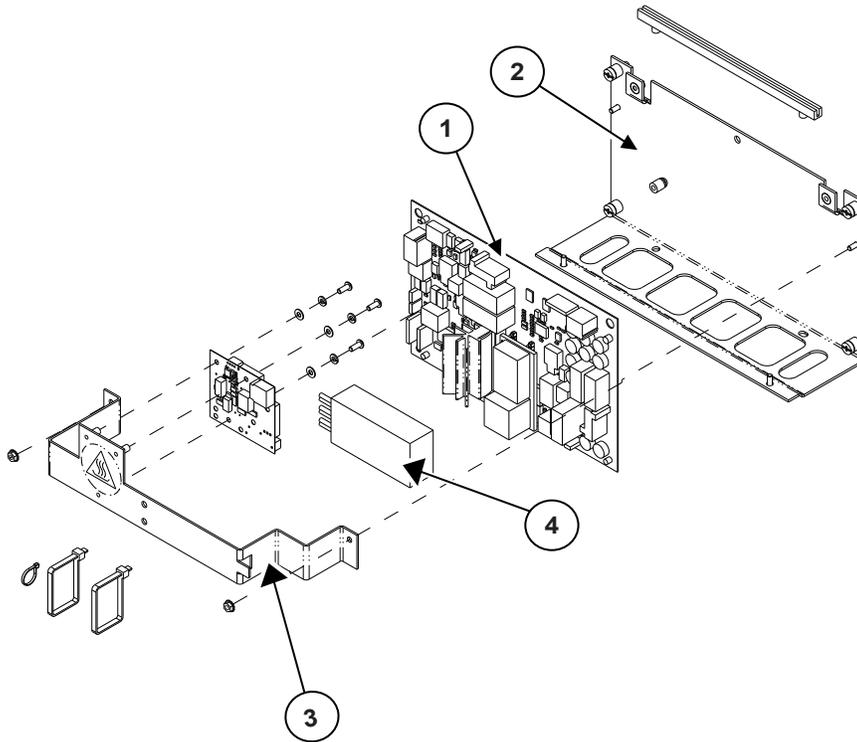
- Use a phillips-head screwdriver to loosen the 2 captive screws at the top of the power board.

Figure 8-25 Captive screws



- Lift and remove the power board out of the nylon guide.

Figure 8-26 Power board panel



1	Power board
2	Power board panel
3	Transformer bracket
4	Observation light transformer

8.4.2 F7 and F8 fuse replacement

Tools required

Needle-nose pliers

Parts required

Fuse F7 and F8

Time required

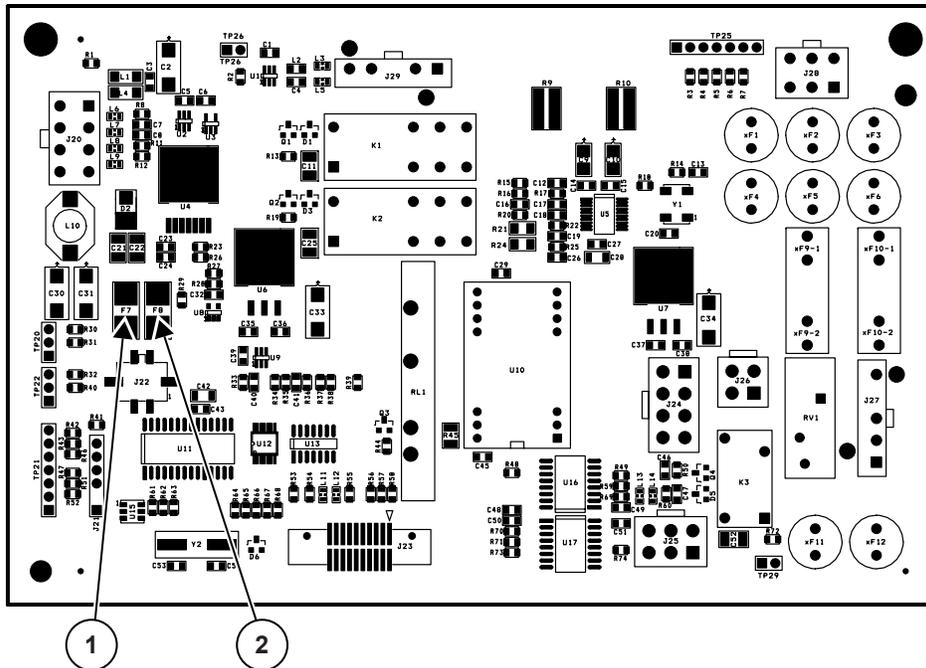
10 minutes



You can replace fuse F7 and F8 but the socket contacts are brass and very easy to bend. If the socket contacts are bent, a loose connection occurs when you install the new fuse. If a socket is damaged, you cannot replace the socket in the field. You must install a new power board. See [Figure 7-4 Power board and outlet panel on page 176](#) for fuse ordering information.

1. Remove the power board. See [8.4.1 Power board on page 249](#).
2. Use needle-nose pliers to pull the fuses out.
3. Carefully install the new fuses with needle-nose pliers.

Figure 8-27 Power assembly



1	F7
2	F8

8.4.3 115 V transformer repair procedure

1. For wall-mounted models, remove the heater head from the wall bracket. See [8.2 Heater head removal from wall bracket \(wall mount only\) on page 229](#).
2. Use a phillips-head screwdriver to loosen the 2 captive screws at the top of the rear panel of the enclosure.
3. Tilt the panel down and lift the 2 tabs at the bottom of the panel up out of the slots.
4. Use a 5.5 mm socket to remove the 2 KEPS nuts that secure the observation light transformer and remove it, and disconnect the electrical connector.
5. Disconnect the connector cable from J24 port from the power board.
6. Check the part number of the 115V transformer.
If the part number is 2065752-001, the Halogen transformer will be replaced by part 5514157.
7. Check the dimmer switch wire harness part number by removing the cable at J25 port from the power board and check the label.
8. If the part number of the dimmer switch is 6600-1588-700, replace with 5514159. See [8.4.7 Observation light dimmer control on page 268](#) to replace the observation light dimmer control.
1 of the cables (white) connects to J25 port and another cable (blue) connects to the back of the transformer circuit board connecting to the 4 point connector.

NOTE

If the wire harness warmer observation light switch has a metal shaft, you will need to order all 4 items:

1. Wire harness warmer observation light switch, 115V transformer, 5514159
2. Observation light knob, 2076390-001
3. Potentiometer mount, M1129877
4. Plastic washer, M1129879

8.4.4 Control board

Tools required

Phillips-head screwdriver

Time required

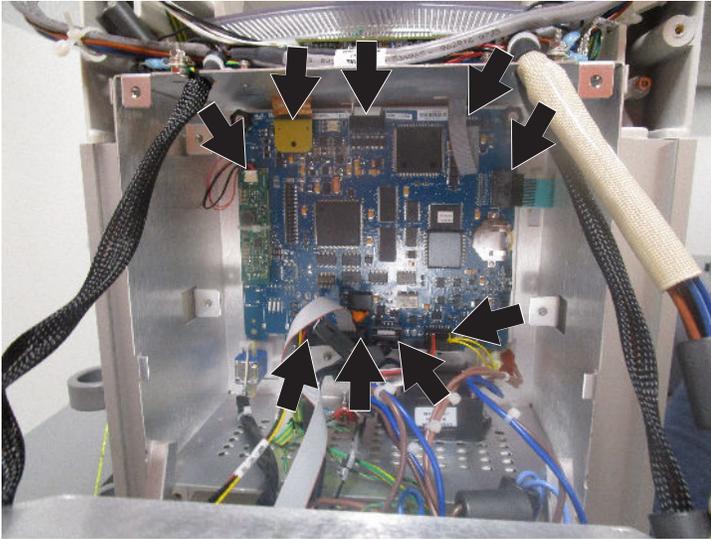
30 minutes

See [Figure 8-16 Electronics enclosure disassembly on page 245](#) and [Figure 8-26 Power board panel on page 253](#).



1. For wall-mounted models, remove the heater head from the wall bracket. See [8.2 Heater head removal from wall bracket \(wall mount only\) on page 229](#).
2. Use a phillips-head screwdriver to loosen the 2 captive screws at the top of the rear panel of the enclosure.
3. Tilt the panel down and lift the 2 tabs at the bottom of the panel up out of the slots.
4. Use a phillips-head screwdriver to loosen the 4 captive screws that secure the power board panel.
5. Tilt the power board panel down and away from the device.
6. Disconnect the electrical connectors of the control board.

The CCFL backlit display has 10 connectors. The LED backlit display has 9 connectors.

Figure 8-28 Electrical connectors of the control board (LED backlit display)

7. Use a phillips-head screwdriver to loosen the 2 captive screws that secure the control board.

Figure 8-29 Control board screws

8. Remove the control board.

Figure 8-30 Control board



9. After you replace the control board, make sure to select the correct product model on the screen at the first time that the device starts.

See [1.4 Introduction on page 17](#) for information on warmer models.

8.4.5 Lithium-Ion battery replacement

Tools required

- Phillips-head screwdriver
- Small screwdriver

Parts required

- Replacement lithium-ion battery

Time required

- 30 minutes

See [Figure 8-16 Electronics enclosure disassembly on page 245](#) and [Figure 8-26 Power board panel on page 253](#).



CAUTION**CHEMICAL IRRITATION HAZARD**

Before you replace the battery:

- Verify you are using the specified replacement part listed in the service manual.
- Make sure the shrink-wrap around the battery is not missing or damaged.

If the battery is not installed correctly, the battery can get too hot and start to smoke.

1. For wall-mounted models, remove the heater head from the wall bracket. See [8.2 Heater head removal from wall bracket \(wall mount only\)](#) on page 229.
2. Use a phillips-head screwdriver to loosen the 2 captive screws at the top of the rear panel of the enclosure.
3. Tilt the panel down and lift the 2 tabs at the bottom of the panel up out of the slots.
4. Use a phillips-head screwdriver to loosen the 4 captive screws that secure the power board panel.
5. Tilt the power board panel down and away from the device.
6. Use a small screwdriver to slide the old lithium-ion battery to the side and out of its holder. Do not apply force perpendicular to the control board.
7. Record the polarity and be sure to install the new lithium-ion battery with the same polarity.

Figure 8-31 Lithium-ion battery



8.4.6 Touch panel or LCD assembly

Tools required

- Phillips-head screwdriver
- 3 mm hex key
- 9 mm nut driver
- 5.5 mm socket wrench
- 7 mm socket wrench

- 2 mm hex key
- Large screwdriver
- Miniature straight-edge screwdriver

Time required

1 hour and 30 minutes

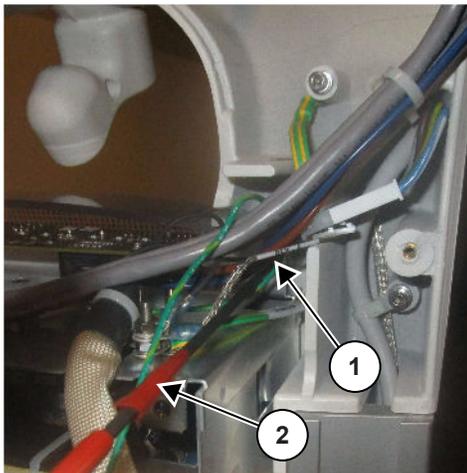
See [Figure 8-26 Power board panel on page 253](#) and [Figure 8-38 LCD display and touch panel on page 263](#).



You cannot get access to the touch panel assembly and LCD display from the front of the device. You must remove the electronics enclosure box to get access to the hardware that secures the touch panel and LCD display.

1. Remove the upper heater housing. See [8.3.1 Upper heater housing removal on page 230](#).
2. Use a phillips-head screwdriver to loosen the 2 captive screws at the top of the rear panel of the enclosure.
3. Tilt the panel down and lift the 2 tabs at the bottom of the panel up out of the slots.
4. Use a 3 mm hex key to loosen the 2 captive screws on the sides of the lens.

Figure 8-32 Captive screws

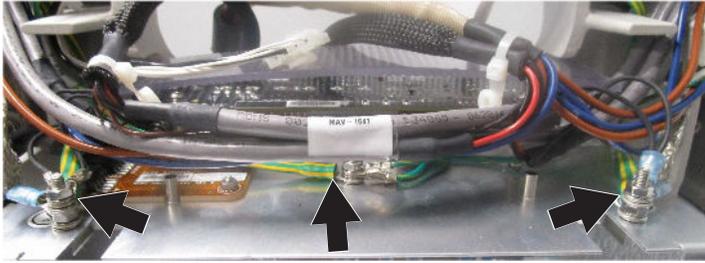


1	Captive screw
2	3 mm hex key

5. Disconnect the 3 connectors on the probe panel interface board.
6. Use a 2 mm hex key to remove the 2 socket screws, split ring washers, and flat washers that secure the wire routing clips to the top of the enclosure.
7. Disconnect the 4 electrical connectors from the heater head assembly to the electronics enclosure, so the electronics enclosure is no longer electronically connected.

8. Use a 7 mm socket wrench to remove the 3 ground wires attached to the top of the enclosure. Note the locations where the ground wires attach to ensure correct reconnection.

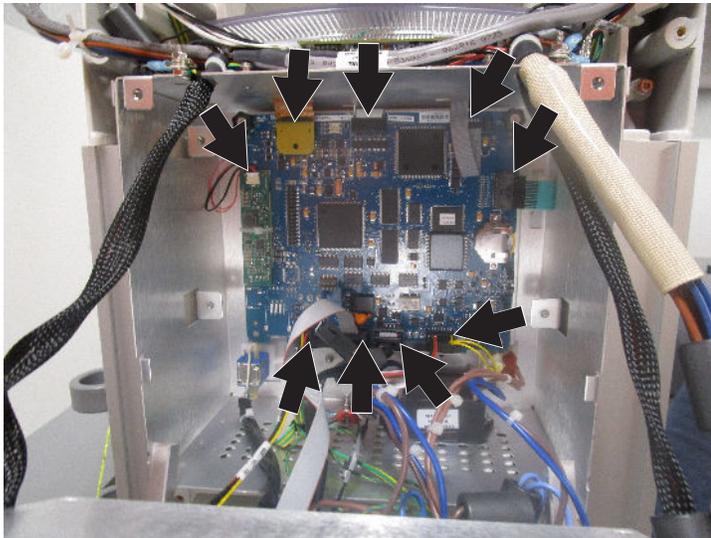
Figure 8-33 Ground wires on electronics enclosure



9. The bottom enclosure box is secured by 2 tabs that fit into slots in the bottom heater housing. Use a large screwdriver to lift the bottom edge of the enclosure and remove the enclosure from between the rails.
10. Use a phillips-head screwdriver to loosen the 4 captive screws that secure the power board panel.
11. Tilt the power board panel down and away from the device.
12. Pull out the power board panel and outlet panel as a pair, as far as the electrical cables allow.
13. Disconnect all electrical connectors that connect the pair to the electronic enclosure.
14. Disconnect the electrical connectors of the control board.

The CCFL backlit display has 10 connectors. The LED backlit display has 9 connectors.

Figure 8-34 Electrical connectors of the control board (LED backlit display)



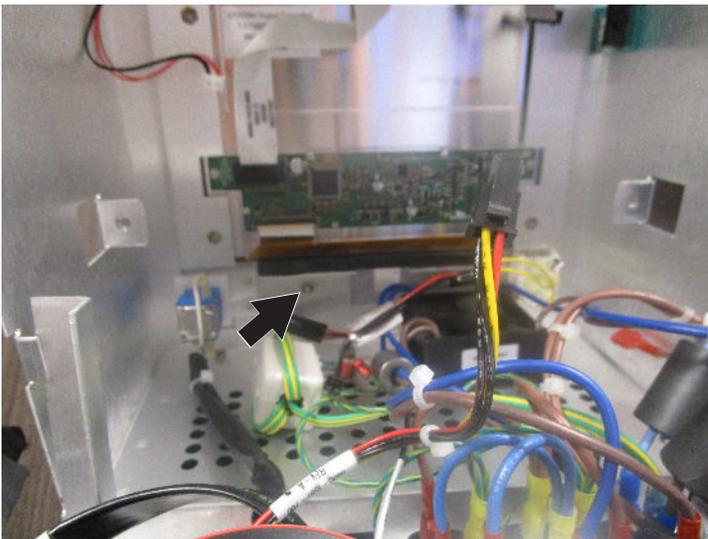
15. Use a phillips-head screwdriver to loosen the 2 captive screws that secure the control board.

Figure 8-35 Control board screws



16. Remove the control board.
17. Remove the observation light knob:
 - For older models, use a miniature straight-edge screwdriver to remove the cap from the observation light knob. The cap is flush with the knob surface. Use a 9 mm nut driver to loosen the locknut on the observation light knob. Pull the observation light knob off the front of the device.
 - For newer models, pull the observation light knob off the front of the device.
18. Disconnect the power standby switch.
19. Use a 5.5 mm socket wrench to remove the KEPS nut from the inside of the enclosure that secures the touch panel.

Figure 8-36 Touch panel KEPS nut



20. Disconnect the electrical connectors of the touch panel.
21. Remove the touch panel.

22. If it is necessary to replace the LCD display, use a 2 mm hex key to remove the 4 button head screws, split washers, and flat washers that secure the display.

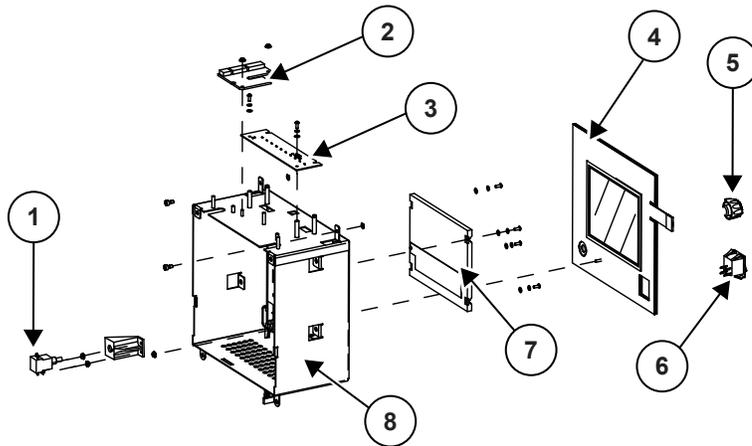
Figure 8-37 Button head screws on LCD display



23. Disconnect the electrical connectors of the LCD display.
The CCFL backlit display has 3 connectors. The LED backlit display has 2 connectors.

24. Remove the LCD display.

Figure 8-38 LCD display and touch panel



1	Observation light switch
2	Probe panel interface board
3	Alarm light board or indicator light board
4	Touch panel
5	Observation light knob
6	Power standby switch
7	LCD display
8	Electronic enclosure

8.4.6.1 LED display upgrade kit

This instruction and parts referenced are applicable only to units that have the CFL Backlit LCD Display 2094207-001. Units that have the CFL Backlit LCD Display may also be recognized by the presence of the CFL Backlight Driver on the Control Board. To identify applicable units, refer to [8.4.6.1.3 Identification of affected product on page 266](#).

CAUTION



PATIENT INJURY HAZARD - DELAY IN CARE

Make sure you install the LED display upgrade kit to the instruction specifications. Make sure you install the cable tie to secure the LED display driver to the control board. After installation, do the pre-use checkout procedure before you put the patient in the device.

8.4.6.1.1 LED display upgrade kit contents

- LED display
- LED driver board
- Mounting, cable tie 4 LG (not shown)
- Double-sided foam tape (not shown)
- Field service instruction: Giraffe™ and Panda™ Warmers LED display upgrade (2096406-001)

Figure 8-39 Field service instruction: Giraffe™ and Panda™ Warmers LED display upgrade (2096406-001)



8.4.6.1.2 LED display upgrade procedure

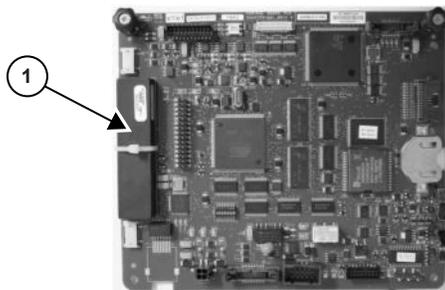
1. Complete the procedures in [8.4.6 Touch panel or LCD assembly on page 258](#) to remove the touch panel and display.

NOTE

The control board will be removed as part of the touch panel or LCD assembly procedure and will be needed for step 2 of this procedure.

2. Place the control board on a flat surface and locate the CFL display driver.

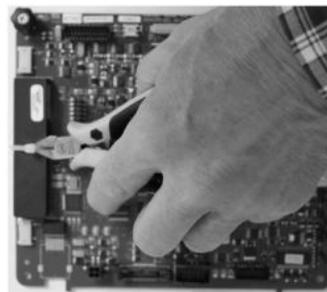
Figure 8-40 Locating the CFL display driver



1	CFL display driver
---	--------------------

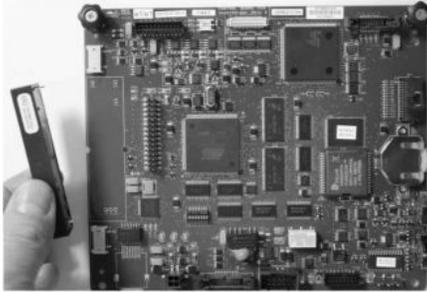
3. Cut and remove the cable tie from the CFL display driver.

Figure 8-41 Removing the cable tie



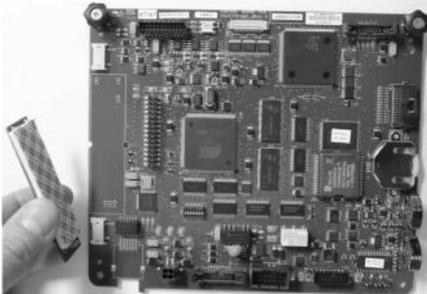
- Using a small flat blade screw driver or similar tool, gently pry the CFL display driver away from the control board and lift it away.

Figure 8-42 Removing the CFL display driver



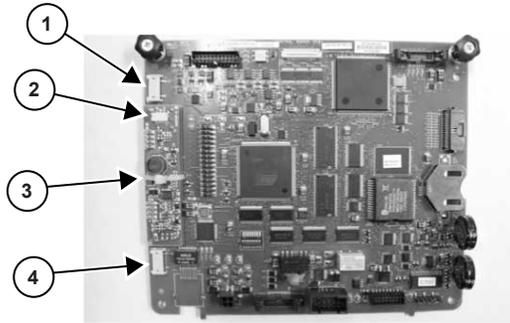
- Locate the LED driver board in the upgrade kit and the double-sided tape.
- Remove the protective film from 1 side of the double-sided tape and apply it to the LED driver board as shown in [Figure 8-43 Aligning pins with through-hole sockets on page 265](#).

Figure 8-43 Aligning pins with through-hole sockets



- Remove the remaining protective film from the double-sided tape.
- Install the LED driver board by first aligning the pins with the through-hole sockets in the control board ([Figure 8-43 Aligning pins with through-hole sockets on page 265](#)).
- Gently but firmly press the LED driver board in place so that the pins are fully inserted and the double-sided tape is pressed fully against the control board surface.
- Install the cable tie through the hole in the control board and wrap it around the LED display driver.

Be sure to pull cable tie tightly around the CFL display driver and trim off the loose end. Final assembly should appear as shown in [Figure 8-44 Pressing the LED driver board in place on page 266](#).

Figure 8-44 Pressing the LED driver board in place

1	Control board connector (do not use)
2	LED driver backlight connector (connect here)
3	Cable tie
4	Control board connector (do not use)

- Reinstall the LED display, touch panel, and control board in reverse order. If needed, refer to [8.4.6 Touch panel or LCD assembly on page 258](#) while completing these procedures.

NOTE

The LED driver backlight connector must be plugged into the mating connector on the LED driver board ([Figure 8-44 Pressing the LED driver board in place on page 266](#)). Do not attempt to plug the LED driver backlight connector into either of the control board connectors.

- Reinstall the electronic enclosure and reconnect all electrical connectors, paying particular attention to the ground connections and the power standby switch configuration.

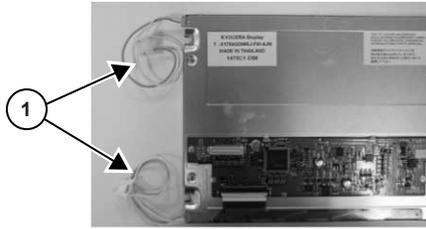
Figure 8-45 Reconnecting electrical connectors

- Reinstall the upper heater housing and electronic enclosure rear cover.
- Power up the device and complete the procedures in [3.2.2 Controller checks on page 89](#) and [3.2.4 Electrical safety tests on page 92](#) before returning the device to patient use.

8.4.6.1.3 Identification of affected product**NOTE**

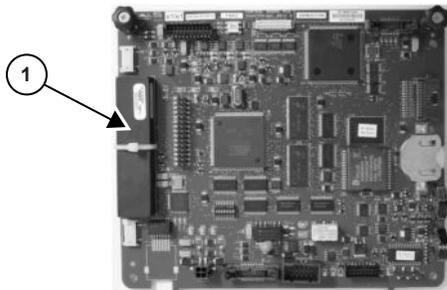
The LED Display Upgrade Kit (2096370-001) is only required for devices that have the CFL display and backlight driver. For devices that already have the LED display, please order 2096187-001 SERVICE KIT DISPLAY, OPITREX 6.50 LED.

Figure 8-46 LCD display with CFL backlighting



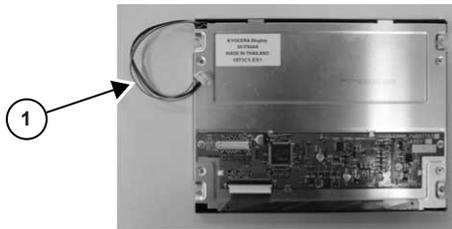
1	2 backlight harnesses
---	-----------------------

Figure 8-47 Giraffe and Panda control board with CFL display backlight driver



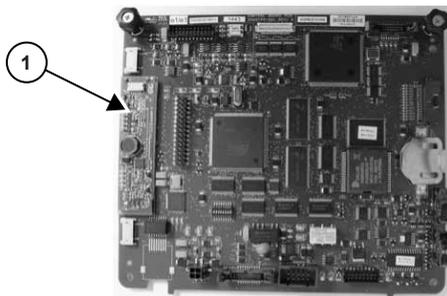
1	CFL display driver
---	--------------------

Figure 8-48 LCD display with LED backlighting



1	1 backlight harness
---	---------------------

Figure 8-49 Giraffe and Panda control board with LED display backlight driver



1	LED display driver
---	--------------------

8.4.7 Observation light dimmer control

Tools required

- Phillips-head screwdriver
- Miniature straight-edge screwdriver
- 9 mm nut driver
- 5.5 mm socket wrench

Time required

40 minutes

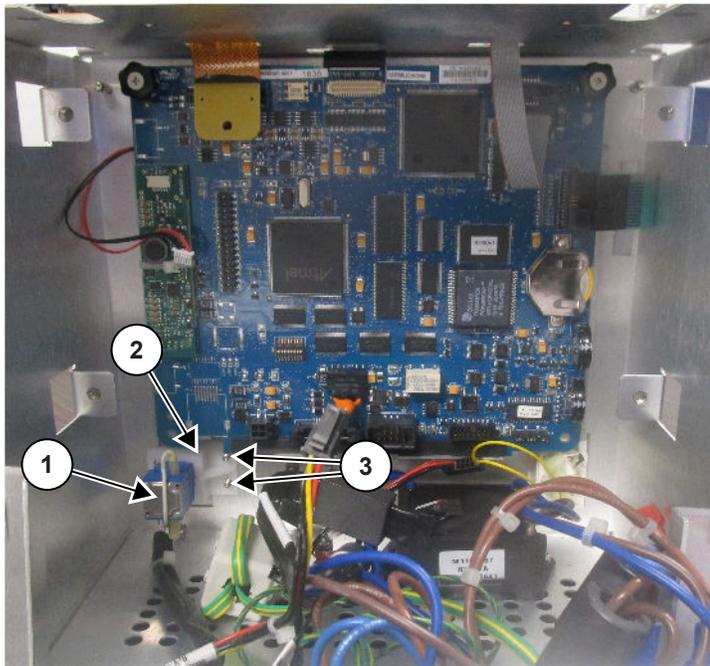
See [Figure 8-38 LCD display and touch panel on page 263](#).



1. For wall-mounted models, remove the heater head from the wall bracket. See [8.2 Heater head removal from wall bracket \(wall mount only\) on page 229](#).
2. Use a phillips-head screwdriver to loosen the 2 captive screws at the top of the rear panel of the enclosure.
3. Tilt the panel down and lift the 2 tabs at the bottom of the panel up out of the slots.
4. Use a phillips-head screwdriver to loosen the 4 captive screws that secure the power board panel.
5. Tilt the power board panel down and away from the device.
6. Remove the observation light knob:
 - For older models, use a miniature straight-edge screwdriver to remove the cap from the observation light knob. The cap is flush with the knob surface. Use a 9 mm nut driver to loosen the locknut on the observation light knob. Pull the observation light knob off the front of the device.
 - For newer models, pull the observation light knob off the front of the device.

- Use a 5.5 mm socket wrench to remove the 2 KEPS nuts from the dimmer control mounting bracket.

Figure 8-50 Observation light dimmer control



1	Observation light dimmer control
2	Dimmer control mounting bracket
3	2 KEPS nuts

- Remove the 1/2 inch hex nut from the dimmer control and mounting bracket assembly.
- Disconnect the electrical connector from the power board.
- Remove the dimmer control.

8.4.8 Power standby switch replacement

Tools required

Phillips-head screwdriver

Parts required

Replacement power standby switch

Time required

40 minutes

See [Figure 8-38 LCD display and touch panel on page 263](#).



- For wall-mounted models, remove the heater head from the wall bracket. See [8.2 Heater head removal from wall bracket \(wall mount only\) on page 229](#).

2. Use a phillips-head screwdriver to loosen the 2 captive screws at the top of the rear panel of the enclosure.
3. Tilt the panel down and lift the 2 tabs at the bottom of the panel up out of the slots.
4. Use a phillips-head screwdriver to loosen the 4 captive screws that secure the power board panel.
5. Tilt the power board panel down and away from the device.
6. To replace the power standby switch, remove the wires behind the power standby switch.
7. Push the tabs on the power standby switch and remove the power standby switch from the front of the device.

8.4.9 Outlet panel repairs

Tools required

- Phillips-head screwdriver
- 5.5 mm socket wrench
- 2 mm hex key
- 10 mm wrench

Time required

40 minutes

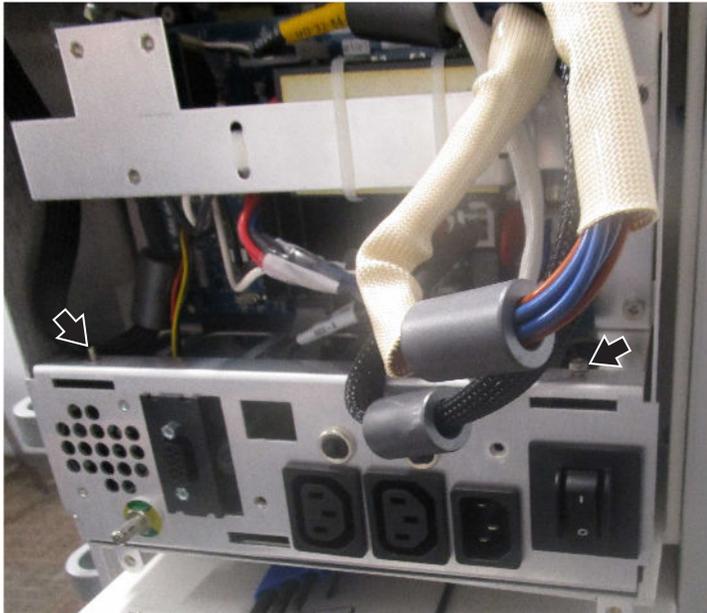
See [Figure 8-53 Outlet panel on page 273](#).



1. Remove the upper heater housing. See [8.3.1 Upper heater housing removal on page 230](#).
2. Use a phillips-head screwdriver to loosen the 2 captive screws at the top of the rear panel of the enclosure.
3. Tilt the panel down and lift the 2 tabs at the bottom of the panel up out of the slots.

4. Use a 5.5 mm socket wrench to remove the 2 KEPS nuts that secure the outlet panel.

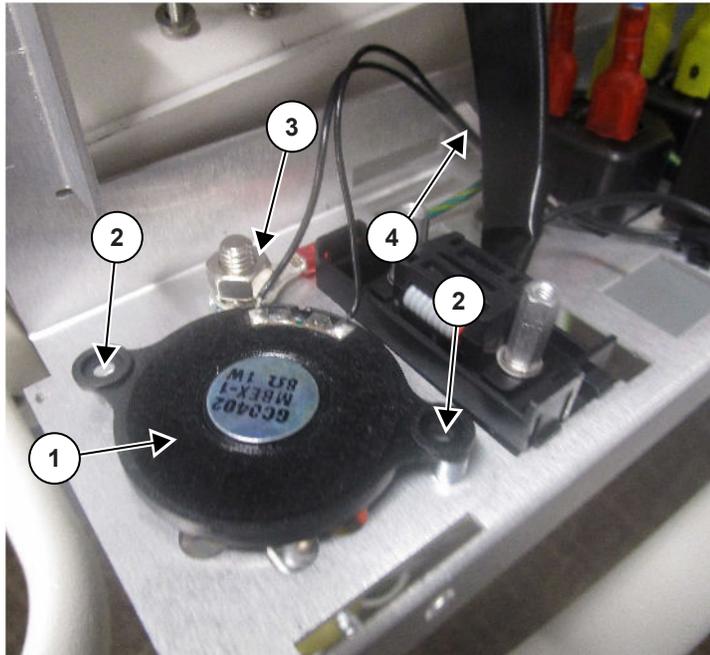
Figure 8-51 KEPS nuts on outlet panel



5. Use a phillips-head screwdriver to loosen the 4 captive screws that secure the power board panel.
6. Lift the outlet panel off the studs and flip the outlet panel down.
7. To remove the speaker:
 - a. Disconnect the electrical connector of the speaker.

- b. Use a 2 mm hex key to remove the 2 button head screws, split ring washers, and flat washers that secure the speaker to the panel.

Figure 8-52 Speaker

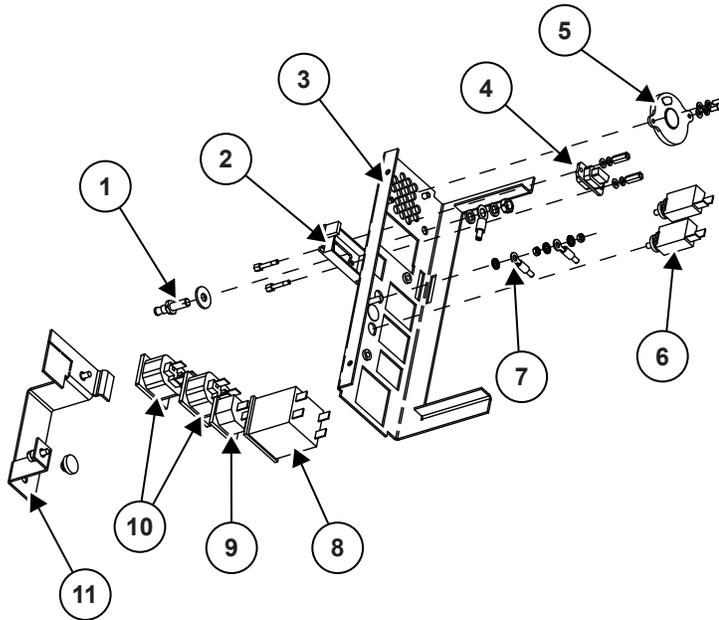


1	Speaker
2	Button head screw locations
3	Ground stud nut
4	Electrical connector of the speaker

8. Use a 10 mm wrench to remove the ground stud nut and star washer.
9. You can disconnect the circuit breakers, power inlet, and line filter and remove them from their cutouts in the outlet panel.
10. To release the accessory outlets, push in the pins that secure the accessory outlets in their cutouts. Accessory outlet circuit breakers are not snap in; they require removal of a dress nut.

- To remove the RS-232 connector, move the 2 movable pins to the right until the rigid pins can clear the edge of the cutout, and press down on the 2 remaining pins.

Figure 8-53 Outlet panel



1	Ground pot. post
2	RS-232 Iso. plate
3	Outlet panel
4	RS-232 connector
5	Alarm speaker
6	Circuit breakers
7	Grounds screw
8	Mains power switch
9	Power inlet
10	Accessory outlets
11	Power cord retainer

8.4.10 Maneuvering handle

Tools required

13 mm socket wrench

Time required

10 minutes

Use a 13 mm socket wrench to remove the 2 nuts, split ring washers, and flat washers from the mounting studs. Move the studs down the dovetail rail and out the bottom.

Figure 8-54 Maneuvering handle

8.5 Probe panel housing repairs

8.5.1 Probe panel housing disassembly

Tools required

3 mm hex key

Time required

10 minutes

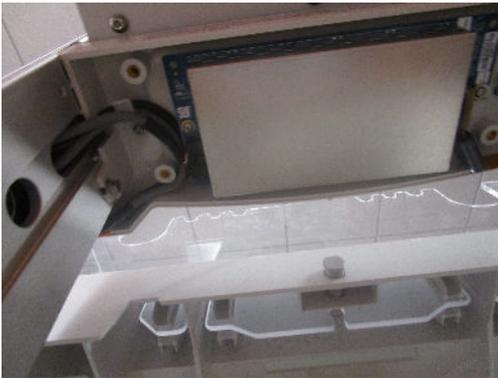
See [Figure 8-66 Probe panel assembly with Masimo SET 1 SpO2 jack on page 286](#), [Figure 8-67 Probe panel assembly with Masimo SET 2 or Nellcor SpO2 jack on page 287](#), and [Figure 8-68 Probe panel assembly with ResusView Heart Rate \(HR\) option \(Panda iRes\) on page 287](#).



1. Lift the bed to its highest position.
2. Tilt the bed until the foot of the bed is fully up.
3. If the warmer has the resuscitation option:
 - a. Remove the tank if a tank is installed. See [3.2.7.1.2 Removing the tank \(blender option only\) on page 103](#).
 - b. Remove the suction tube from the suction port at the bottom of the resuscitation unit.
4. Use a 3 mm hex key to remove the 4 screws that attach the bottom cover to the probe panel.

5. Move the bottom cover down and in the direction of the bed to remove.

Figure 8-55 Probe panel bottom cover removed



8.5.2 HR module removal (Panda iRes Warmers with ResusView Heart Rate (HR) option only)

Tools required

Short 8 mm nut driver or socket wrench

Time required

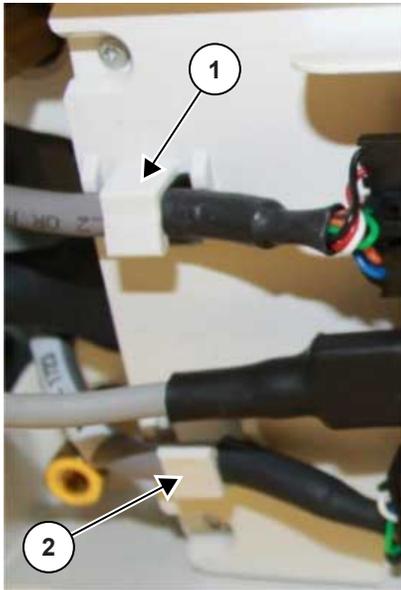
20 minutes

Devices that include the ResusView Heart Rate (HR) option may require removal of the module before completing repairs.

1. Follow the instructions in [8.5.1 Probe panel housing disassembly on page 274](#) to remove the probe panel lower housing.
2. Remove the control and scale harnesses from the tension clips.

NOTE

Failure to free the harnesses from the tension clips will prevent removal of their respective connectors.

Figure 8-56 Control and scale harnesses in tension clips

1	Control harness tension clip
2	Scale harness tension clip

3. Disconnect the control cable from the HR interface board.

Figure 8-57 HR interface board with harnesses and standoffs

1	Control harness
2	Standoffs (4)
3	Scale harness

4. Disconnect the scale harness connector from the HR interface board ([Figure 8-57 HR interface board with harnesses and standoffs on page 276](#)).
5. Use a short 8 mm nut driver or socket wrench to remove the 4 mounting standoffs inside the HR module housing ([Figure 8-57 HR interface board with harnesses and standoffs on page 276](#)).
6. Lower the HR module and then pull the HR module forward, being careful to clear the patient probe/scale connector plate and the SpO2/filler plate.

7. Place the HR module on a flat, ESD protected surface used for additional HR module repair procedures or servicing other parts of the device.
8. Reinstall the HR module by following the instructions in this procedure (including [8.5.1 Probe panel housing disassembly on page 274](#)) in reverse.

8.5.3 SpO2 interface board replacement

The label on the probe panel housing identifies which SpO2 system is installed:

Table 8-1 Probe panel labels

Masimo SET (1 or 2)	Nellcor
	

For Masimo SET 1, see [Figure 8-66 Probe panel assembly with Masimo SET 1 SpO2 jack on page 286](#). For Masimo SET 2 and Nellcor, see [Figure 8-67 Probe panel assembly with Masimo SET 2 or Nellcor SpO2 jack on page 287](#).

NOTE

Devices that include the ResusView Heart Rate (HR) option may require removal of the HR module before completing repairs.

8.5.3.1 SpO2 interface board replacement for Masimo SET 1

Tools required

- 3 mm wrench
- 2 mm hex key

Parts required

- Replacement SpO2 board

Time required

- 20 minutes

See [Figure 8-66 Probe panel assembly with Masimo SET 1 SpO2 jack on page 286](#).

1. Do 1 of the following:
 - For devices without the ResusView Heart Rate (HR) option, continue at step 2 of this procedure.
 - For devices that include the ResusView Heart Rate (HR) option, follow the instructions in [8.5.2 HR module removal \(Panda iRes Warmers with ResusView Heart Rate \(HR\) option only\) on page 275](#) and continue at step 3 of this procedure.
2. Remove the probe panel lower housing following the instructions in [8.5.1 Probe panel housing disassembly on page 274](#).
3. Remove the bottom end cap from the west dovetail rail and remove the decorative strip so that the SpO2 ground wire screw can be accessed.

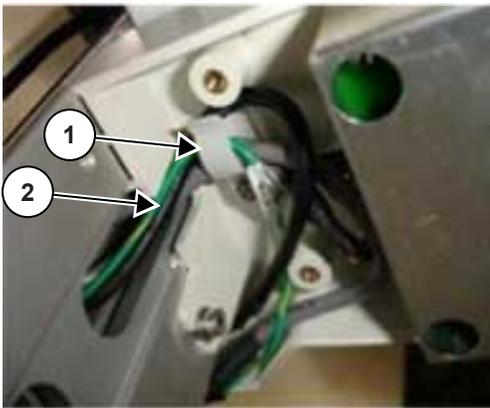
4. Use a 3 mm wrench to remove the SpO2 ground wire screw. (Note the location of ground strap for re-assembly.)

Figure 8-58 SpO2 ground screw



5. Pull the wire harnesses out of the tension clip.

Figure 8-59 Wire harnesses in tension clip



1	Tension clip
2	Wire harnesses

6. Pull the scale/patient probe plate down to clear the upper housing.
7. Disconnect the SpO2 cable leading to the east dovetail rail.
8. For a bedded model, tilt the bed so the back is down and the front is all the way up.
9. Using a 3 mm wrench, remove the 2 screws mounting the upper housing.
10. Slide the upper panel forward to clear the rail slots.
11. Remove the upper housing.
12. Place the HR module on a flat, ESD protected surface used for additional HR repair procedures or servicing other parts of the device.

13. Disconnect the SpO2 flex circuit connector.
14. Remove the 2 button head screws securing the metal housing/SpO2 assembly to the top of the probe panel housing using a 2 mm hex key. (Note the location of ground strap for re-assembly.)
15. Remove the metal housing/SpO2 assembly, and separate the 2 halves of the metal housing.
16. To replace the board assembly, use a 2 mm hex key to remove the 4 socket head screws and the lock tooth washers that secure the SpO2 interface board to the metal housing.
17. Reverse the preceding procedure to install the replacement SpO2 board and complete the assembly.
18. If equipped with the ResusView Heart Rate (HR) option, reinstall the HR module following the instructions in [8.5.2 HR module removal \(Panda iRes Warmers with ResusView Heart Rate \(HR\) option only\)](#) on page 275 in reverse.

8.5.3.2 SpO2 interface board replacement for Masimo SET 2 and Nellcor

Tools required

3 mm wrench

Parts required

Upper probe panel assembly from the upgrade kit

Time required

20 minutes

WARNING



PATIENT INJURY HAZARD

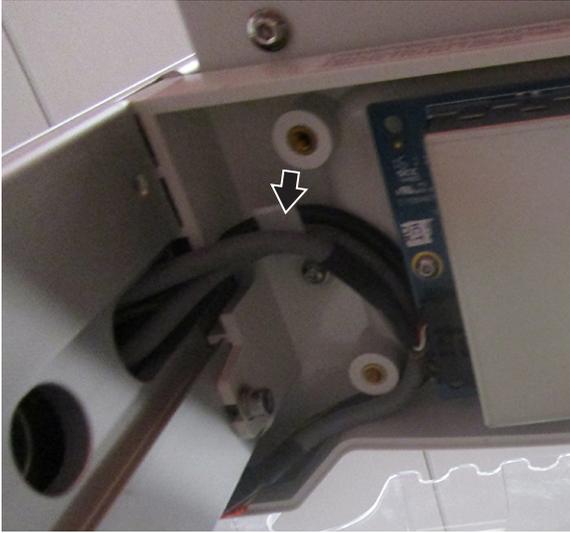
You must correctly install the SpO2 ground strap to make sure the device is compliant with EMC and ESD standards.

See [Figure 8-67 Probe panel assembly with Masimo SET 2 or Nellcor SpO2 jack](#) on page 287.

1. Remove the bottom end cap from the west dovetail rail and remove the decorative strip so that the SpO2 ground wire screw can be accessed.
2. Disassemble the probe panel housing following instructions in [8.5.1 Probe panel housing disassembly](#) on page 274.

3. Pull the wire harnesses out of the tension clip.

Figure 8-60 Wire harnesses in tension clip



4. Pull the scale/patient probe plate down to clear the upper housing.
5. Disconnect the SpO2 cable leading to the east dovetail rail.
6. Use a 3 mm wrench to remove the SpO2 ground wire screw. (Note the location of ground strap for re-assembly.)

Figure 8-61 SpO2 ground screw



7. Using a 3 mm wrench, remove 2 screws mounting the upper housing. Save the hardware to use again in [Step 10](#).
8. Slide the upper panel forward to clear the rail slots.
9. Remove the upper housing and any electronics within the upper housing. Discard per local requirements.

10. Using a 3 mm wrench and the parts saved from [Step 7](#) (2 M4x12 socket head screws, 2 M4 internal lock star washers, and 2 M4 flat washers), install the upper probe panel assembly from the upgrade kit, mounting the probe panel to the rails.
11. Push the ground strap from the upper probe panel assembly to the outside of the west rail, and use a 3 mm wrench to attach it with the M4x12 socket head screw and 2 M4 internal lock star washers included in the kit.
12. Connect SpO2 harness from east rail to SpO2 board assembly.
13. Re-install the loose harnesses under the tension clip.
Be sure to route the patient probe harness around the mounting boss for the lower cover.
14. Re-install the scale/patient probe plate. Do not pinch the wires when installing.
15. It may be advisable to perform an abbreviated functional checkout procedure on the SpO2 connection, scale connection, and temperature probe connection.
16. Using a 3 mm wrench, 4 M4x12 socket head screws, 4 M4 split lock washers, and 4 M4 flat washers, re-install the lower housing.
17. Re-install the appearance strip and end cap.
18. Add the appropriate logo label above the power standby switch.

8.5.4 SpO2 connector/flex circuit replacement

Tools required

3 mm wrench or hex key

Time required

20 minutes

See [Figure 8-66 Probe panel assembly with Masimo SET 1 SpO2 jack on page 286](#) and [Figure 8-67 Probe panel assembly with Masimo SET 2 or Nellcor SpO2 jack on page 287](#).

1. Remove the bottom end cap from the west dovetail rail and remove the decorative strip so that the SpO2 ground wire screw can be accessed.

- Use a 3 mm wrench to remove the SpO2 ground wire screw. (Note the location of ground strap for re-assembly.)

Figure 8-62 SpO2 ground screw



- Disassemble the probe panel housing following instructions in [8.5.1 Probe panel housing disassembly on page 274](#).
- Unplug the flex circuit from the SpO2 board.
- Remove the flex circuit/plate assembly from the upper housing by pulling on the plate. This is a friction fit that may require some force.
- Remove the connector end of the flex circuit by carefully prying the connector off the plate. Save the plate for re-assembly.

8.5.5 HR acquisition board or HR interface board replacement for ResusView Heart Rate option

Tools required

2 mm hex key

Time required

30 minutes

See [Figure 8-68 Probe panel assembly with ResusView Heart Rate \(HR\) option \(Panda iRes\) on page 287](#).

- Disassemble the probe panel housing following instructions in [8.5.1 Probe panel housing disassembly on page 274](#).



- Remove the HR module following instructions in [8.5.2 HR module removal \(Panda iRes Warmers with ResusView Heart Rate \(HR\) option only\) on page 275](#).

3. To replace the HR interface board:
 - a. Disconnect the harness warmer USB cable.
 - b. Use a 2 mm hex key to remove the 1 screw holding the HR interface board to the carrier board mounting plate.

The single screw goes all the way through the mounting plate and connects to the EMC board below it on the HR acquisition board. This is very important when reinstalling the HR interface board.

- c. Push down the 2 tabs on the mounting plate opposite from the USB connector and slide the interface board to line up the tabs in board and remove it.

Figure 8-63 HR interface board



- d. If not replacing the HR acquisition board, skip to [Step 4.i](#).
4. To replace the HR acquisition board:
 - a. Remove the 6 torx screws from the carrier board mounting plate and remove the mounting plate.

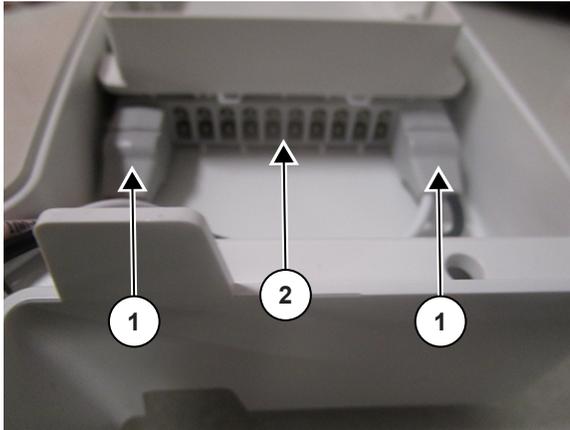
Figure 8-64



- b. Disconnect the HR acquisition board cable connector.
 - c. Disconnect the HR acquisition plug connectors. Note the connector placement.
 - d. Replace the HR acquisition board. The board is not held in by screws and should lift out.
 - e. Reconnect the HR acquisition plug connectors.
 - f. Reconnect the HR acquisition board cable.

- g. Replace the HR acquisition board housing.
- h. Reinstall or replace the HR interface board.
- i. Reinstall the HR module following instructions in [8.5.2 HR module removal \(Panda iRes Warmers with ResusView Heart Rate \(HR\) option only\)](#) on page 275.
- j. Reassemble the probe panel housing following instructions in [8.5.1 Probe panel housing disassembly](#) on page 274.

Figure 8-65 HR acquisition board and connectors



1	HR acquisition plug connectors
2	HR acquisition board

8.5.6 Scale connector replacement (bedded only)

Tools required

- 9/16 inch open end wrench
- Wire cutters

Time required

30 minutes

See [Figure 8-66 Probe panel assembly with Masimo SET 1 SpO2 jack](#) on page 286. If the device has HR upgrade, the scale harness is a short cable that connects to the HR interface board rather than the longer cable routed up the rail to the probe panel interface board. Harness warmer scale rail cable then routes up the rail to the probe panel interface board.

1. Disassemble the probe panel housing following instructions in [8.5.1 Probe panel housing disassembly](#) on page 274.
2. If the device has HR upgrade option installed, remove the HR module following instructions in [8.5.2 HR module removal \(Panda iRes Warmers with ResusView Heart Rate \(HR\) option only\)](#) on page 275.
3. Remove the upper heater housing. See [8.3.1 Upper heater housing removal](#) on page 230.
4. Remove the left bottom rail end cap.
5. Slide the decorative strip down and remove it from the dovetail rail.

6. Remove the socket head screw which retains the tie wrap holding the 3 harnesses near where they connect to the flex board, and cut the tie wrap.
7. Disconnect connector J53 from probe panel interface board.
8. Feed the cable through the slot below the alarm light board (non-IEC compliant devices) or indicator light board (IEC compliant devices), and out the bottom of the rail.
9. Using a 9/16 inch open end wrench, loosen the mounting nut on the back of the probe panel plate that secures the scale connector.
10. Unthread and remove the scale connect cap and ring from the front of the scale connector.
11. Slide the connector out the rear of the probe panel plate, making sure to properly align the flat portion of the connector with the D-shaped hole.
12. Replace the harness by reversing the preceding instructions.

8.5.7 Patient probe connector replacement

Tools required

- 11/16 inch open-end wrench
- Wire cutter

Time required

- 15 minutes

See [Figure 8-66 Probe panel assembly with Masimo SET 1 SpO2 jack on page 286](#) and [Figure 8-67 Probe panel assembly with Masimo SET 2 or Nellcor SpO2 jack on page 287](#).



1. Disassemble the probe housing following instructions in [8.5.1 Probe panel housing disassembly on page 274](#).
2. If the device has HR upgrade option installed, remove the HR module following instructions in [8.5.2 HR module removal \(Panda iRes Warmers with ResusView Heart Rate \(HR\) option only\) on page 275](#).
3. Remove the upper heater housing. See [8.3.1 Upper heater housing removal on page 230](#).
4. Remove the left bottom rail end cap.
5. Slide the decorative strip down and remove it from the dovetail rail.
6. Disconnect connector J54 from probe panel interface board.
7. Remove the socket head screw which retains the tie wrap holding the 3 harnesses near where they connect to the flex board, and cut the tie wrap.
8. Feed the cable through the slot below the alarm light board (non-IEC compliant devices) or indicator light board (IEC compliant devices), and out the bottom of the rail.
9. Using an 11/16 inch open end wrench, remove the nut from the back of the patient probe connector.
10. Feed the harness through the hole in the jack plate.
11. Replace the harness by reversing the preceding instructions.

8.5.8 Probe panel upper housing replacement

Tools required

3 mm hex key or wrench

Time required

30 minutes

1. Follow procedures in [8.5.1 Probe panel housing disassembly on page 274](#) through [8.5.7 Patient probe connector replacement on page 285](#) as appropriate to remove all parts from the probe panel upper housing.

Figure 8-66 Probe panel assembly with Masimo SET 1 SpO2 jack

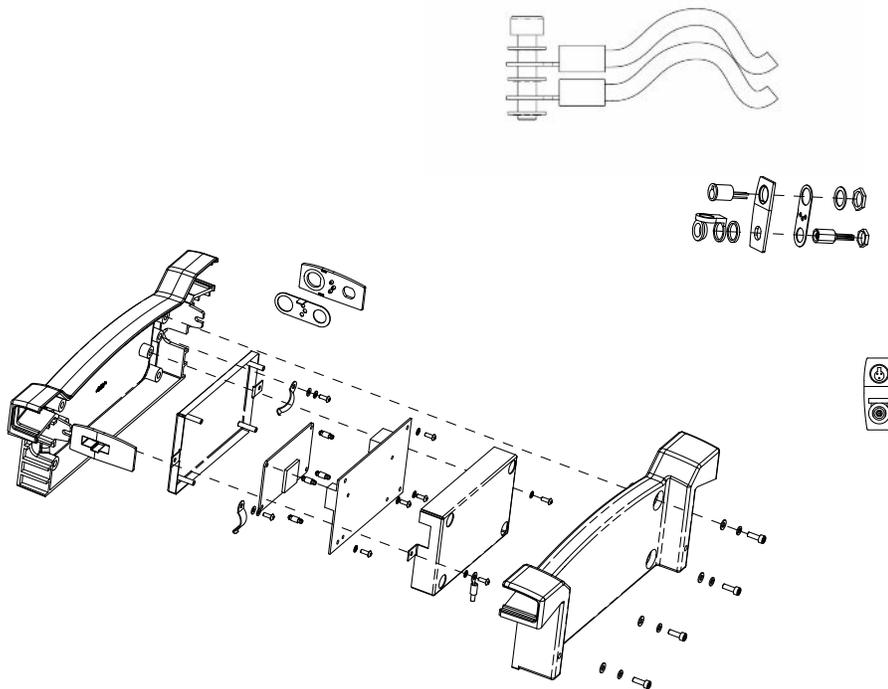
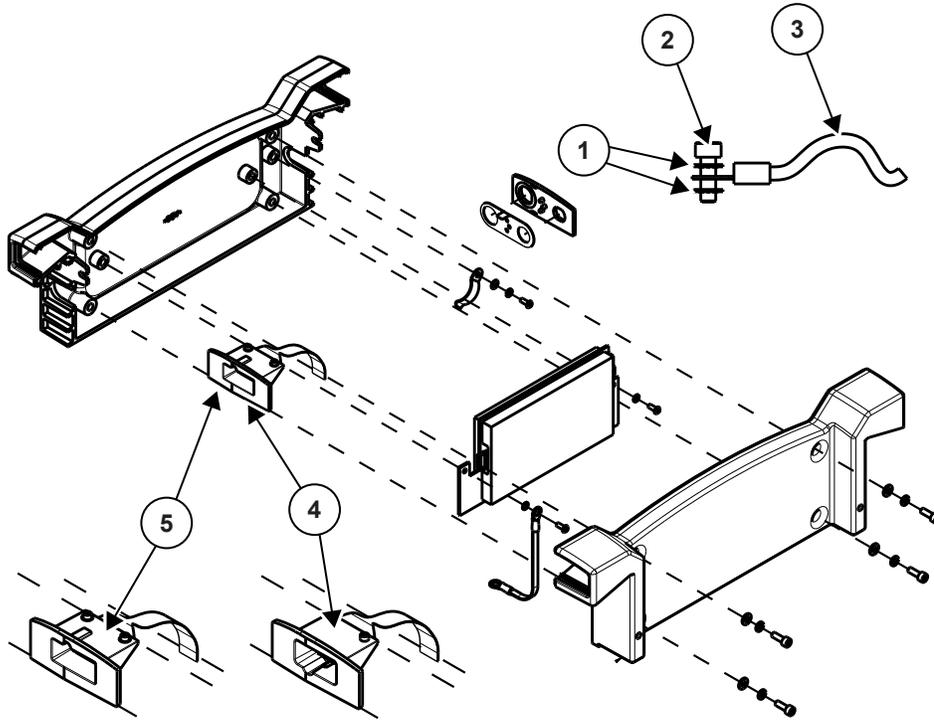
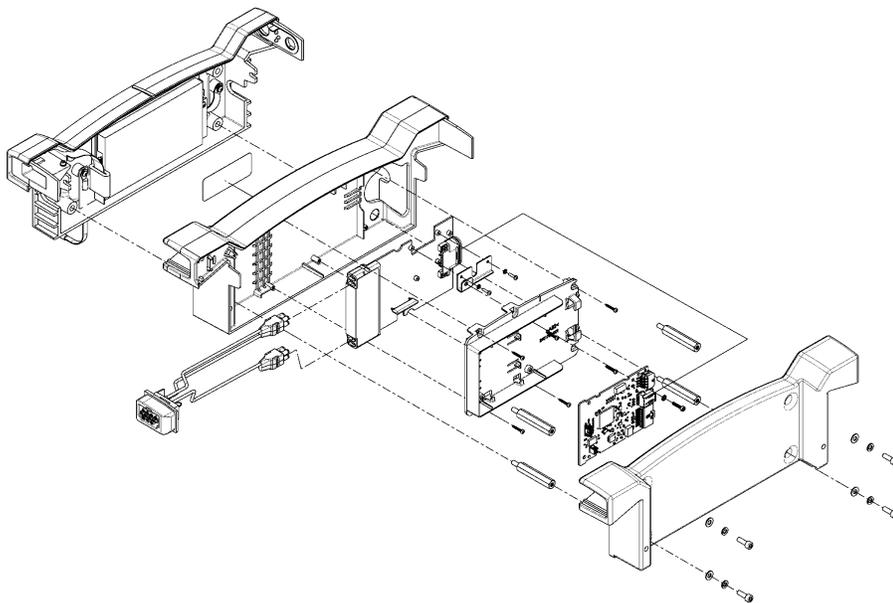


Figure 8-67 Probe panel assembly with Masimo SET 2 or Nellcor SpO2 jack



1	M4 internal lock star washer
2	M4 x 12 screw
3	Ground strap
4	Nellcor
5	Masimo SET 2

Figure 8-68 Probe panel assembly with ResusView Heart Rate (HR) option (Panda iRes)



- Use a 3 mm hex key or wrench to remove the 2 screws mounting the upper housing to the dovetail rails.

3. Slide the upper housing forward to remove it from the dovetail rails.
4. Reverse the preceding instructions to reassemble.

8.6 Appearance strip replacement

Tools required

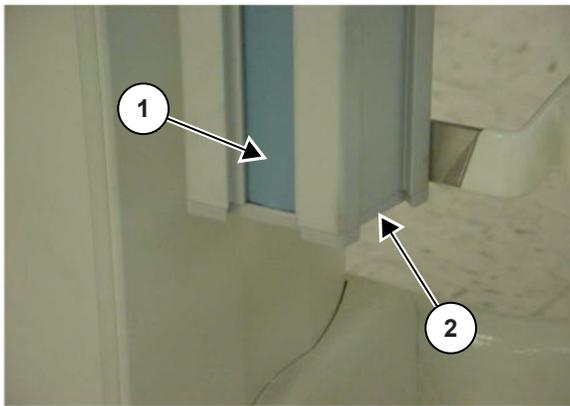
Small screwdriver

Time required

10 minutes

- For bedded and wall-mounted models:
 1. Use a small screwdriver to remove the rail end cap.

Figure 8-69 End cap

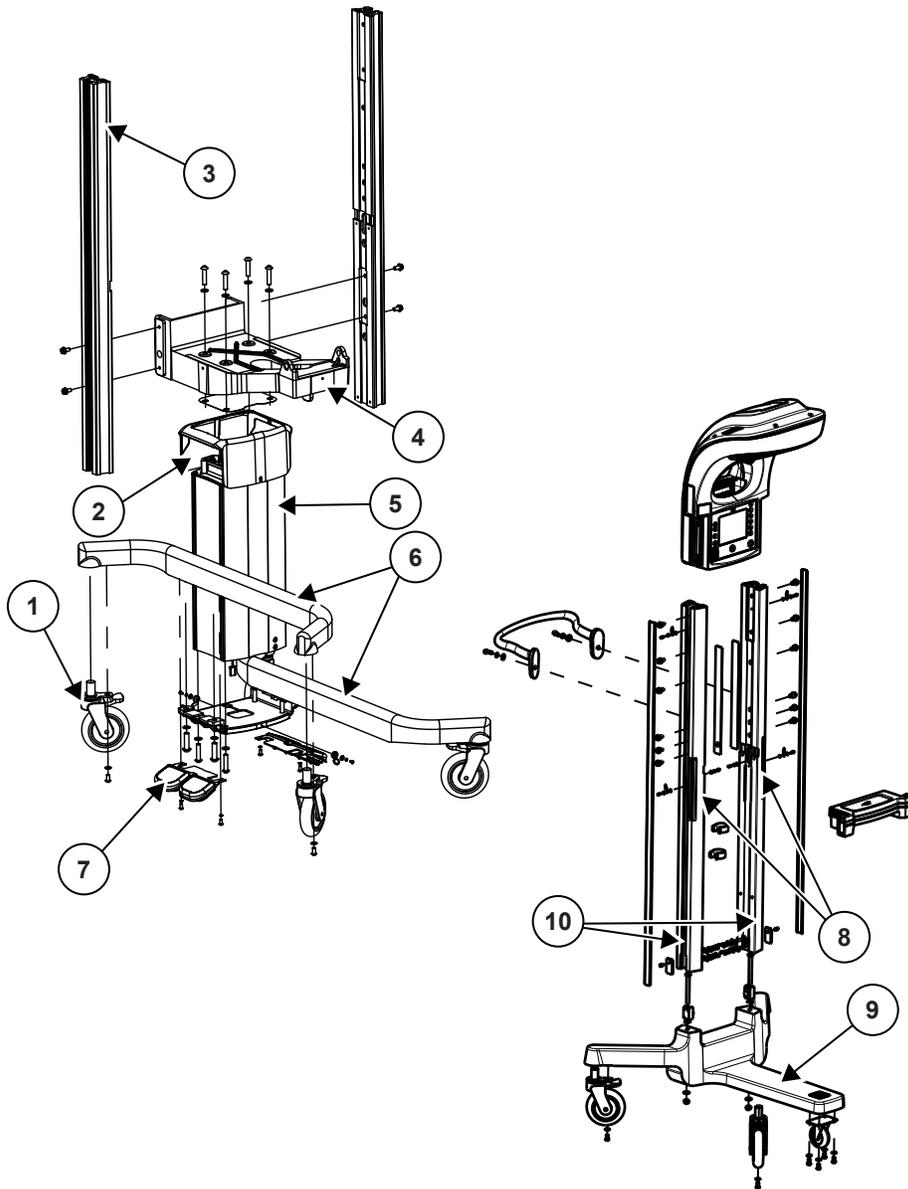


1	Appearance strip
2	End cap

2. Pull the strip downward out of the dovetail rail.
- For freestanding models:
 1. Insert a small screwdriver into the back of the strip using 1 of the slots provided on the sides of the strip near the base.
 2. Push the strip end out to grab.
 3. Gently pull the strip out of the dovetail rail.

8.7 Lower unit repairs (bedded and freestanding)

Figure 8-70 Base, legs, and rails



1	Caster
2	Base shroud
3	Dovetail rails
4	Main bracket
5	Elevating column
6	Legs
7	Foot switch
8	Freestanding rails
9	Freestanding base

10

Rail mounting blocks

8.7.1 Removing the bed (bedded only)

Tools required

4 mm hex key

13 mm wrench

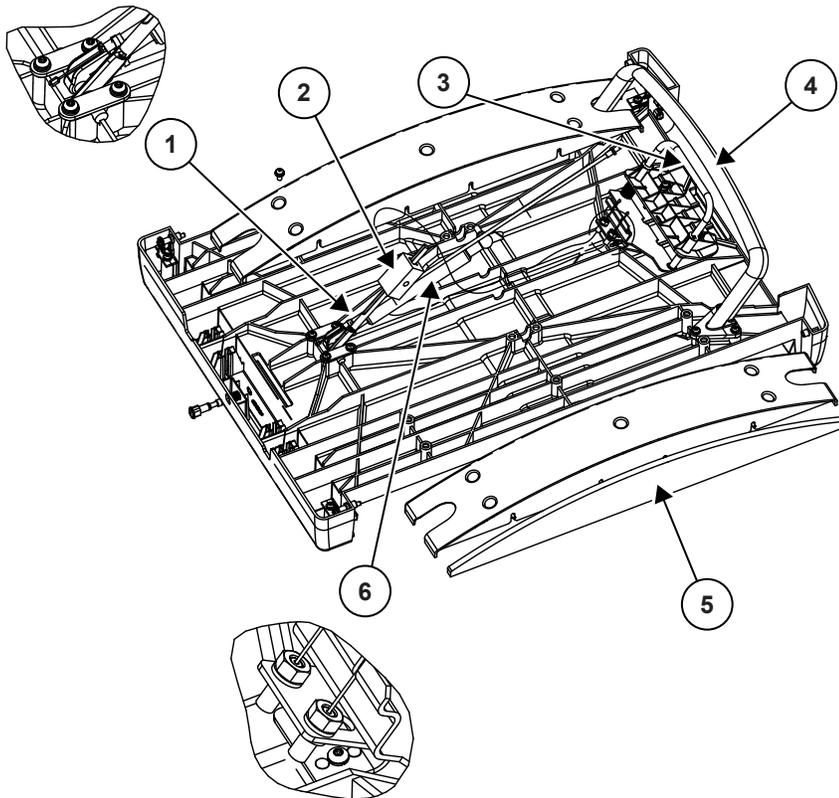
Time required

1 hour and 30 minutes

Personnel required

2 people

Figure 8-71 Bed disassembly

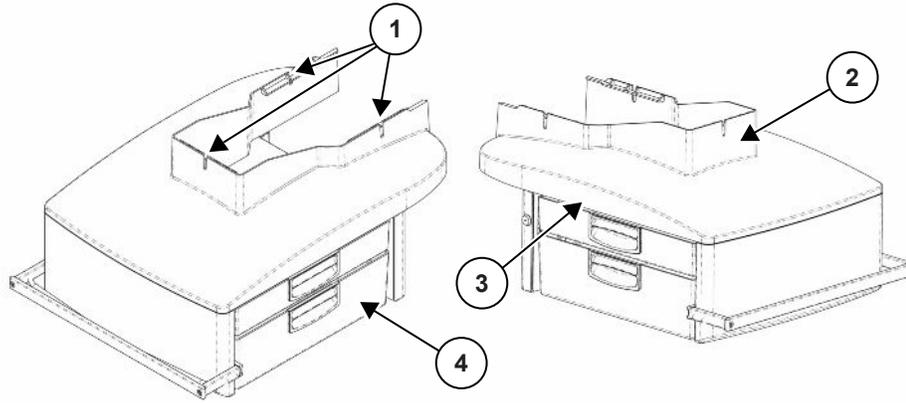


1	Threaded strut
2	Secondary lock
3	Tilt handle
4	Front handle
5	Pontoon inlay
6	Hydraulic tilt cylinder

1. Remove the bedside panels, mattress, and translation deck (described in the user manual), and drawers. You may wish to raise the warmer bed to its highest position for better access.
2. Use a 4 mm hex key to remove the 3 socket head screws, split ring washers, and flat washers that hold the storage module to the main bracket.

The storage module rests on the bracket and will stay in place until you slide it forward.

Figure 8-72 Storage module



1	Mounting screw locations
2	Shroud
3	Grasp here
4	Drawers

3. Standing in front of the device, grasp the storage module on both sides and remove it by sliding it forward.
4. Use a 13 mm wrench to remove the nut and split ring washer that secures the gas tilt cylinder from the main bracket.
5. Use a 4 mm hex key to remove the secondary bed locking mechanism from the main bracket.
6. To remove secondary lock, squeeze the tilt release and slide the lock off its threaded strut.

7. Use a 4 mm hex key to remove 1 screw, and loosen the other screw, that fasten each of the pivot plates to the bottom of the bed on either side of the main bracket. Swing the plates aside so that the bed can be lifted up off the pivot rod later.

Figure 8-73 Pivot plate



8. The bed can be lifted off and turned over to access all the tilt parts.

8.7.2 Elevating column replacement (bedded only)

Tools required

- 2.5 mm hex key
- 4 mm hex key
- 5 mm hex key
- 6 mm hex key

Time required

1 hour and 30 minutes

Personnel required

2 people

See [Figure 8-70 Base, legs, and rails on page 289](#).

1. If possible, lower the elevating column to the lowest position.

2. Disconnect the base power cord from the back of the column.

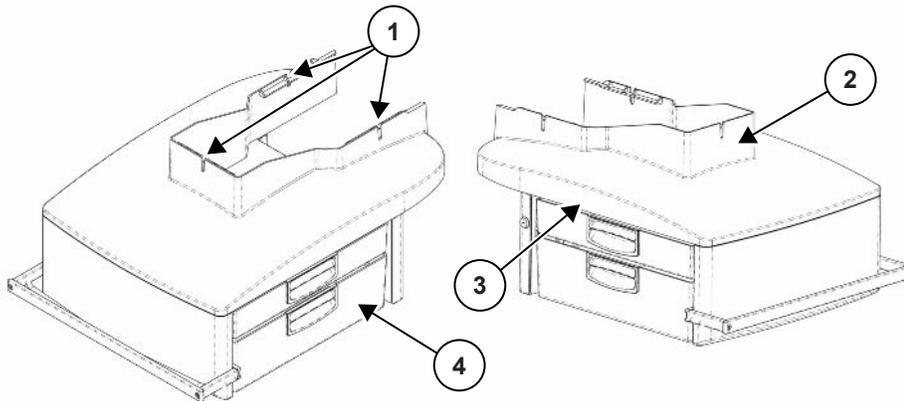
Figure 8-74



3. Lock all the casters.
4. Use a 4 mm hex key to remove the 3 socket-head screws, split ring washers, and flat washers that hold the storage module to the main bracket.

The storage module rests on the bracket and will stay in place until you slide it forward.

Figure 8-75 Storage module



1	Mounting screw locations
2	Shroud
3	Grasp here
4	Drawers

5. Standing in front of the device, grasp the storage module on both sides and remove it by sliding it forward.

6. Use a 6 mm hex key to remove the 4 bolts that secure the top of the elevating column to the main bracket.
Tilting the bed forward allows easier access to the 4 screws.
7. With the assistance of another person, lift the upper portion of the warmer and move it to the side off the base.
8. Pry open the screw covers. Use a 2.5 mm hex key to loosen the 2 screws that secure the base shroud.

Figure 8-76 Base shroud screw



9. Remove the base shroud.
10. Disconnect the foot switch connectors.
11. Use a 5 mm hex key to remove the 4 bolts that secure the column to the legs and remove the elevating column.
When reassembling, be careful not to cross thread the 4 bolts that hold the elevating column to the main bracket.

8.7.3 Foot switches (bedded only)

Tools required

- 2.5 mm hex key
- 4 mm hex key

Parts required

- Replacement foot switch

Time required

- 30 minutes

See [Figure 8-70 Base, legs, and rails on page 289](#).



1. Run the bed up to the elevating column's top travel limit.
2. Unplug the device.

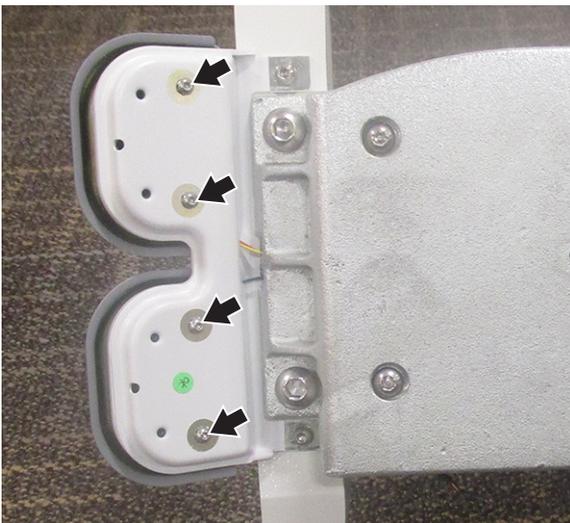
- Use a 2.5 mm hex key to remove the hinged screw covers and screws that secure the base shroud. Slide the shroud up out of the way.

Figure 8-77 Base shroud screw



- Make note of the foot switches' electrical wire routing. The cable from the replacement foot switch must feed up through the same slot.
- Use a 4 mm hex key to remove the 4 button-head socket screws on either side of the foot switch.

Figure 8-78



- Disconnect the foot switch electrical connector.
- Remove and discard the old foot switch.
- Install the new foot switch. Make sure that you do not pinch the electrical wires.
- Ensure that foot switch connectors are secured with retaining clips.

8.7.4 Caster replacement (bedded and freestanding)

Tools required

- 6 mm hex key
- Blocks (if the warmer is upright)

Time required

10 minutes

See [Figure 8-70 Base, legs, and rails on page 289](#).

The casters may be replaced with the device upright or carefully placed on its back.

1. Lock all the other casters.
2. If the device is upright, lift the caster off the floor and use blocks to support the leg near the caster you are replacing.
3. Use a 6 mm hex key to remove screw(s) from boss underneath the leg casting.

Figure 8-79 Caster screw



4. Secure the caster to the leg by tightening the screw(s) through the caster plate into the boss in the bottom of the leg.

8.7.5 Adjusting bed height using manual elevating column (bedded only)

Devices without an electric elevating column (not equipped with foot switches) can be adjusted manually.

- On older devices, the adjustment system consists of a pin driven across the width of the column, 7 pairs of setting holes in the inner stationary column, and a gas spring inside the column to compensate for the weight of the bed and heater while the height is being adjusted.
- On newer devices, the adjustment system consists of a socket on the column and a separate crank handle.

Manually adjustable devices will be shipped at the lowest bed height setting.

8.7.5.1 Adjusting bed height on devices with the pin

Tools required

- Large screwdriver
- Rubber hammer or mallet
- Strong board 1 m long
- Ratchet strap (optional)
- Small screwdriver or hex key

Increasing the bed height is relatively easy, since the spring force pushes the bed up. However, decreasing bed height will require 2 people, unless a tool such as a ratchet strap is used to compress the spring and lower the bed to the desired height.

1. The adjustment pin is held in place by retaining screws (with large diameter flat heads counter bored in the column) that fit into threaded holes in both ends of the pin. Use a large screwdriver to remove 1 of these slot head retaining screws that are located on either side of the warmer, about half way up the column.

It does not matter which side of the column: either retaining screw can be removed. If the device is equipped with a suction canister bracket, you may wish to remove it.

2. Use a rubber hammer or mallet and a large screwdriver or punch to drive the pin out from the end with the retaining screw removed.

You may wish to hold the bed down so that it does not jam the screwdriver as the spring is released.

3. Allow the bed to rise to the desired height. If possible, do not allow the bed to reach its highest point, where the internal spring is fully extended, since this makes compressing the spring to lower the bed more difficult.

The best way to compress the spring is to push down on the main bracket casting directly above the column. However, this spot is not easily accessible. A strong board or piece of wood about a meter long can be passed under the bed across the top of the casting, then both installers can press down evenly on both ends of the board, until the column reaches the desired bed height.

4. While 1 installer holds the bed in position, the other checks the alignment of the holes on 1 side of the column, and then drives in the pin.

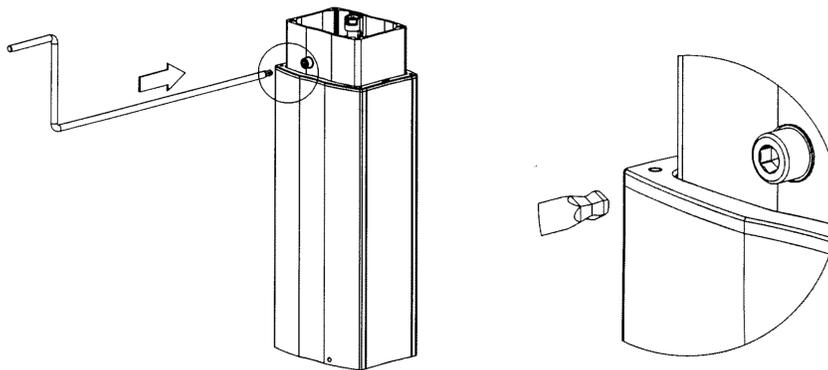
It may be necessary to use a small screwdriver or hex key as a lever to push up or down on the pin end inside the column to align the pin and the holes on opposite side.

5. Re-install the retaining screw to secure the pin and lock the bed in place.

8.7.5.2 Adjusting bed height on devices with the crank handle

1. Insert the crank handle into the socket (see [Figure 8-80 Crank handle on page 297](#)).

Figure 8-80 Crank handle



2. Turn the crank handle to adjust the bed height:
 - Turn the crank handle clockwise to raise the bed.
 - Turn the crank handle counterclockwise to lower the bed.

8.7.6 Base and rail mounting block replacement (freestanding only)

WARNING



PERSONNEL INJURY HAZARD

Do not use the M4 screws to attach the mounting block to the rail more than 1 time. If you use the M4 screws again, this will make the joint less secure. You must discard the old M4 screws and use new M4 screws when you replace the mounting block.

WARNING



PERSONNEL INJURY HAZARD

Install the mounting block, retaining plates, and base in the correct sequence with the correct torque specifications. If you do not do this, the joints will be less secure.

Tools required

- Socket wrench with a 15 mm deep socket
- 4 mm hex key
- 3 mm hex key
- Torque wrench
- Long forceps

Parts required

- Four M4 x 25 mm socket-head capscrews

Time required

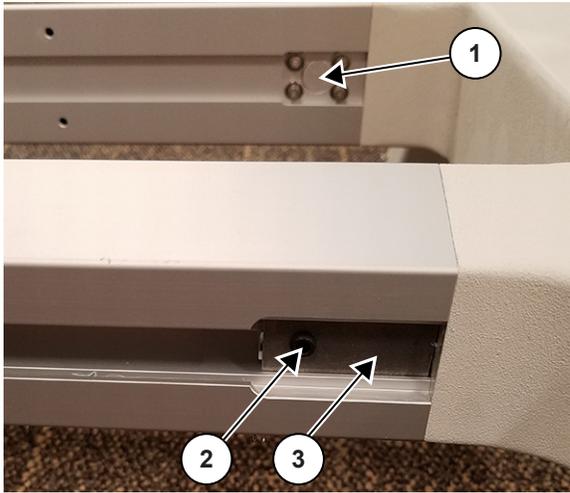
- 30 minutes

See [Figure 8-70 Base, legs, and rails on page 289](#).

1. Lock the casters.
2. Lay the freestanding warmer on the floor.
3. Use a socket wrench with a 15 mm deep socket to remove the 2 M10 nuts from the bottom of the base and pull the base away from the rails to release the base.
4. Remove the appearance strip.

5. To remove the rail mounting block on each rail, use a 4 mm hex key to remove the M8 set screw and the retaining plate and then use a 3 mm hex key to remove the 4 M4 screws attaching the mounting block to the rail while holding the block and then pull it out of the rail.

Figure 8-81

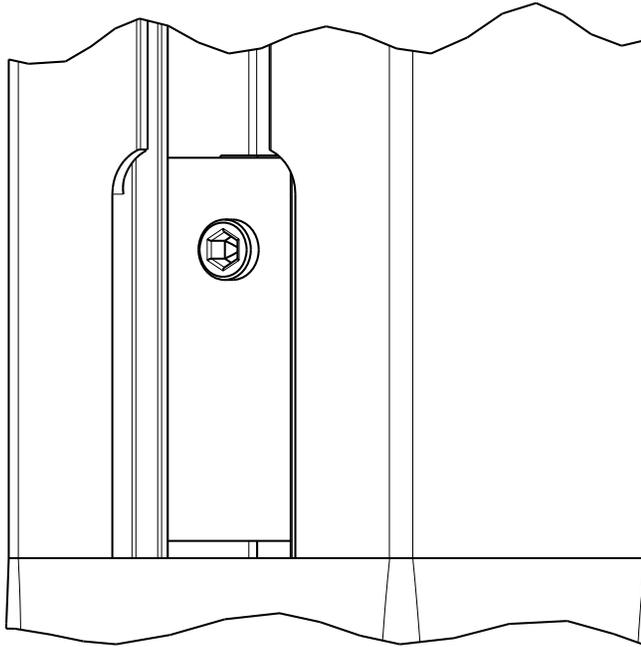


1	M4 screws
2	Set screw
3	Retaining plate

6. Discard the removed M4 screws. Use new M4 screws for re-installation.
7. Reverse steps for re-installation. It is necessary to re-install the removed parts in the following order to avoid diminishing the joint strength:
 - a. Use a torque wrench to torque the 4 M4 screws on each mounting block to 21 ± 3 lb-in (2.37 ± 0.34 N-m).

- b. Re-install the retaining plates in the rails such that the top of the plates are aligned with the top of the mounting block and M8 set screws are located on top.

Figure 8-82 Retaining plate

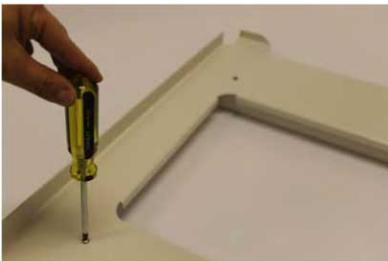


- c. Use a torque wrench to torque the 2 M8 set screws on each plate to 75 ± 11 lb-in (8.5 ± 1.2 N-m).
- d. Re-install the base back onto the M10 bolts and use long forceps to re-install the 2 M10 flat washers and then use a torque wrench to torque the M10 lock nuts to 345 ± 52 lb-in (39 ± 5.9 N-m).
- e. Inspect for good contact of mounting block to rails after assembly.

8.8 Scale control board replacement

1. Use a Phillips screw driver to remove the scale tray screws.

Figure 8-83 Remove the scale tray screws



2. Use a small wrench to remove the 2 screws on the control board cover, and remove the cover.

Figure 8-84 Remove the control board cover screws



3. Disconnect the scale harness and load cell cables from the control board.

Figure 8-85 Disconnect the scale harness

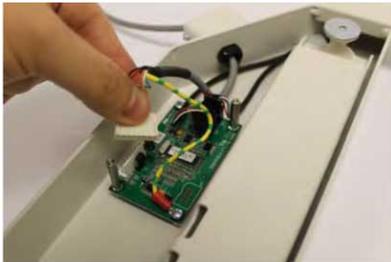
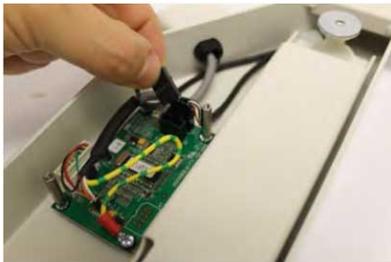


Figure 8-86 Disconnect the load cell cables



4. Use a Phillips screw driver and a wrench to remove the screws and spacers attaching the control board to the scale chassis, and remove the control board.

Figure 8-87 Remove the control board



5. Reverse the steps to re-install the control board.
6. Perform the necessary checkout procedures in Chapter 2, "Installation and service checkout."

8.9 Scale load cell replacement

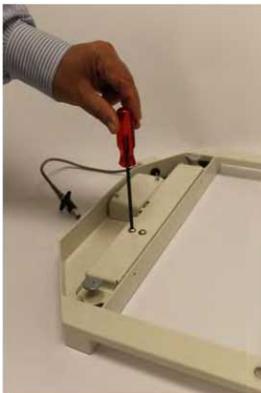
1. Disconnect the scale cable from the bed, and remove the scale.
2. Use a Phillips screw driver to remove the scale tray screws.
3. Use a small wrench to remove the 2 screws on the control board cover, and remove the cover.
4. Disconnect the scale harness and load cell cables from the control board.
5. Use a 4 mm hex key to remove the load cell cover screws on the top and on the bottom of the scale, release the load cell cable, and then remove the load cell.

NOTE

To access the load cell cover screws on the bottom of the scale, remove the stickers that cover the screw holes.

Take note of the orientation of the load cell cover for re-installation.

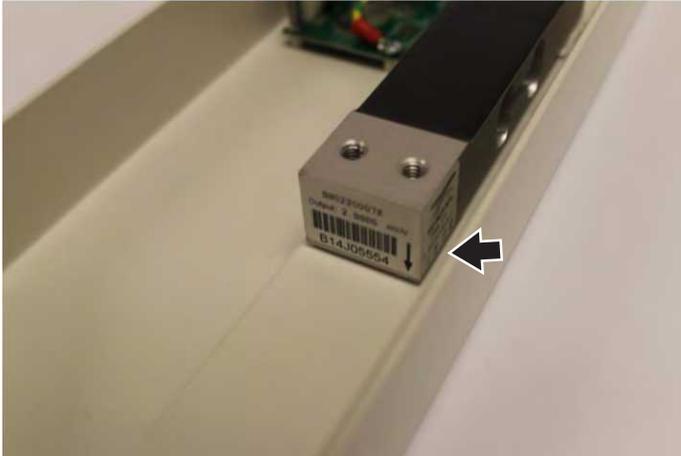
Figure 8-88 Remove the load cell cover screws



6. Reverse the steps to re-install the load cells.

NOTE

Load cells must be installed with the correct orientation. Specifically, the arrow symbol on the load cell must point downward (toward the bottom of the scale chassis).

Figure 8-89 Correctly oriented load cell

7. Perform the necessary checkout procedures in Chapter 2, "Installation and service checkout."

8.10 Dovetail rail suction tubing disassembly

To remove the suction tubing from the dovetail rail:

1. Disconnect the suction tubing from the suction canister.
2. Remove the end cap from the bottom of the dovetail rail.
3. Move the trim strip down the dovetail rail to get access to the suction tubing.
4. Pull the suction tubing out through the top hole.
5. Remove the suction tubing from the connection at the bottom of the resuscitation system.

Do these steps in the opposite sequence to install new suction tubing. Do a functional check. Refer to [3.2.7.2 Suction checkout on page 105](#).

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Chapter 9 Preventive maintenance

9.1 Maintenance schedule

Approved service personnel must do service maintenance.



WARNING

PERSONNEL OR PATIENT INJURY HAZARD

No modification of this equipment is allowed.



WARNING

PERSONNEL OR PATIENT INJURY HAZARD

Preventive maintenance must be done in accordance with the service manual preventive maintenance procedures for safe and correct device operation. If you do not do preventive maintenance, this can cause injury to the patient or user, cause the device to not operate correctly, or cause damage to the device.



WARNING

ELECTRICAL SHOCK HAZARD

Do not clean or service the device while the power cord is connected to an electrical outlet. This can cause an electrical shock.

Disconnect the power cord from the electrical outlet before cleaning or service. Connect the device to an electrical outlet only when told to in the cleaning or service procedure.



WARNING

PATIENT INJURY HAZARD - HYPOTHERMIA

Do not put the patient in the bed in Warmup Mode. Warmup Mode quickly makes the bed warm and keeps the bed warm before you put the patient in the bed. Warmup Mode must not be used with a patient because the Check Baby Alarm is disabled. You must use Manual Mode or Baby Mode with a patient.

9.1.1 User maintenance

This schedule gives the minimum frequencies. Always obey hospital and local regulations for the required frequencies.

Obey the maintenance instructions from the manufacturer of the ECG cables.

Obey the maintenance instructions from the manufacturer of the lead-wire.

After each patient

- Clean and disinfect the warmer.

Refer to the user manual for the guidelines to clean and disinfect.

- Obey the instructions of the SpO2 probe manufacturer for cable and probe maintenance.
- Replace the disposable SpO2 probes, patient straps, and any other single use or single patient use parts.
- Clean and disinfect the resuscitation system.
Refer to the user manual for the guidelines to clean and disinfect.
- Replace the disposable suction canister.
- Replace the suction tubing between the suction canister and the patient.

At 3 month intervals

- Inspect the suction tubing that is put through the dovetail rail. See [8.10 Dovetail rail suction tubing disassembly on page 303](#) for instructions to replace the suction tubing.
- Do a test of the blender supply pressure alarm. See [9.4 Testing the supply pressure alarm on page 310](#).

9.1.2 Service maintenance

This schedule gives the minimum frequencies. Always obey hospital and local regulations for the required frequencies.

At installation

- Do the mechanical safety checks. See [3.2.1 Mechanical checks on page 86](#).
- Do the controller checks. See [3.2.2 Controller checks on page 89](#).
- Do the electrical safety checks. See [3.2.4 Electrical safety tests on page 92](#).
- Do the equipment checks for optional features, if installed. See [3.2.3 Equipment checks for optional features on page 91](#).
- Do the scale checkout procedures, if installed. See [3.2.5 Scale checkout procedures on page 94](#).
- Do the resuscitation system service checkout, if installed. See [3.2.7 Resuscitation system setup and checkout procedures on page 99](#).
- Do the ResusView Heart Rate Option checkout procedures, if installed. See [3.2.6 ResusView™ Heart Rate option checkout procedures \(Panda iRes Warmers\) on page 98](#).
- Do the Nurse call checkout procedure, if installed. See [3.2.8.4 Nurse call checkout on page 116](#).

Each year

- Do the mechanical safety checks. See [3.2.1 Mechanical checks on page 86](#).
- Do the controller checks. See [3.2.2 Controller checks on page 89](#).
- Do the electrical safety checks. See [3.2.4 Electrical safety tests on page 92](#).
- Do the equipment checks for optional features, if installed. See [3.2.3 Equipment checks for optional features on page 91](#).
- Calibrate the scale unless your country requires a lower frequency. See [4.1 Scale calibration \(bedded only\) on page 117](#). If your country does not allow you to calibrate the scale each year, then do the scale checkout procedures. See [3.2.5 Scale checkout procedures on page 94](#).
- Do the resuscitation system service checkout, if installed. Refer to the *Resuscitation Systems Service Manual*.

- Do the ResusView Heart Rate Option checkout procedures, if installed. See [3.2.6 ResusView™ Heart Rate option checkout procedures \(Panda iRes Warmers\)](#) on page 98.
- Do the Nurse call checkout procedure, if installed. See [3.2.8.4 Nurse call checkout](#) on page 116.

At 2 year intervals

- Replace the battery. The battery operates the power failure alarm and supplies power to memory circuits during a power failure.
- Do the blender maintenance. Refer to the *Resuscitation Systems Service Manual*.

9.2 Disassembling the bedside panels

WARNING



INFECTION HAZARD

You must wear the correct personal protective equipment (PPE) when you disassemble the bedside panel.

WARNING



INFECTION HAZARD

Obey facility procedures for cleaning or servicing dirty or contaminated devices and components.

Tools and equipment required

Personal Protection Equipment (PPE) required to service dirty or contaminated devices or components (for example, disposable gloves)

2.5 mm allen wrench or torque driver

1. Put on the required PPE.
2. If the bedside panel is installed on the warmer, remove the panel from the warmer.

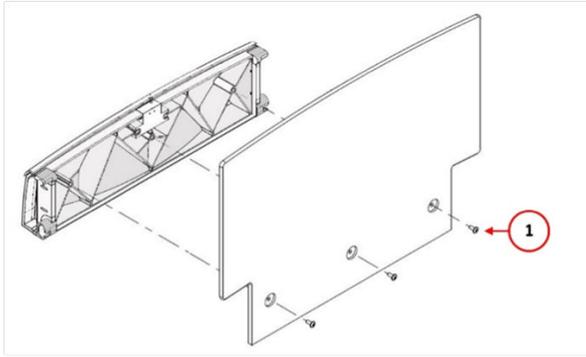
Figure 9-1 Bedside panel removal



3. Remove the 3 allen head screws to separate the panels.

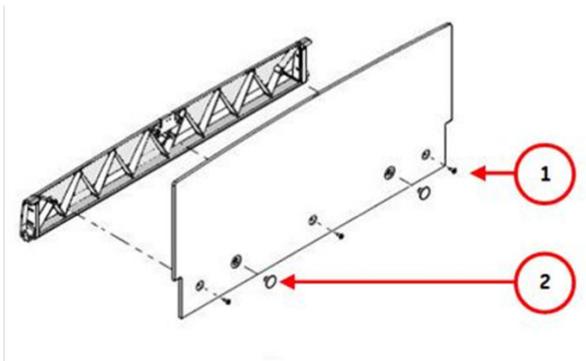
The acrylic wall panel is assembled to the molded door frame with 3 allen-head panel mounting screws as shown in [Figure 9-2 Front bedside panel assembly](#) on page 308 and [Figure 9-3 Side bedside panel assembly](#) on page 308.

Figure 9-2 Front bedside panel assembly



1	Allen head panel mounting screws (quantity 3)
---	---

Figure 9-3 Side bedside panel assembly

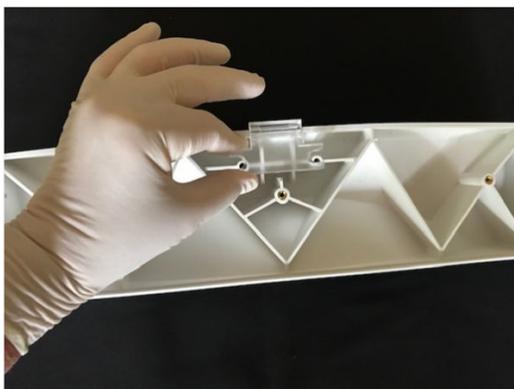


1	Allen head panel mounting screws (quantity 3)
2	Post snap hood hinge "bumper" (quantity 2). The bumpers are only installed on Giraffe Warmer bedside panels.

4. If there are post snap hood hinges (bumpers) installed on the panel, lift the edge of each bumper until it comes out of the panel.
5. Lift the bed level indicator assembly to remove it from the molded door frame.

The bed level indicator assembly fits between 2 posts in the molded door panel and does not require screws or fasteners to hold it in place.

Figure 9-4 Bed level indicator assembly removal



6. Remove and dispose of gloves and PPE.
7. Send the disassembled bedside panel components for cleaning according to the cleaning and disinfection guidelines in the user manual.

9.3 Reassembling the bedside panels

CAUTION



PERSONNEL OR PATIENT INJURY HAZARD

Inspect the bedside panel carefully and do not use it if it is damaged or has missing parts.

CAUTION



PERSONNEL OR PATIENT INJURY HAZARD

Do not use the bedside panel if you cannot assemble it correctly again.

CAUTION



PERSONNEL INJURY HAZARD

Make sure the bedside panel mounting screws are torqued or tightened to the specified level.

This section gives the steps required to assemble the warmer bedside panels again after cleaning and disinfection.

Replacement hardware components are available in a kit. See [Table 9-1 Field Replacement Unit \(FRU\) kit and part number on page 309](#). The kit contains: 10 panel mounting screws, 4 post snap hood hinges (bumpers), and 3 bed level indicator assemblies (1 for the front bedside panel and 2 for the side bedside panels).

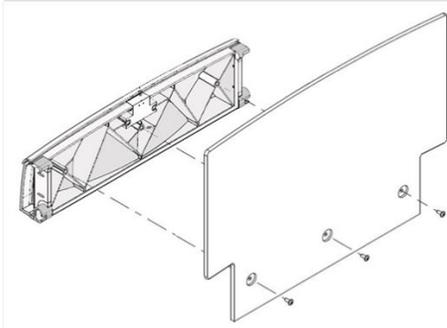
Table 9-1 Field Replacement Unit (FRU) kit and part number

Kit description	Part number
Panda / Giraffe Warmer Wall Hardware Components	5696913

1. Install the bed level indicator assembly in the molded door frame. See [Figure 9-4 Bed level indicator assembly removal on page 308](#).
If the bed level indicator assembly is damaged, missing parts, or does not look clean, obtain a replacement bed level indicator assembly.
2. Put the acrylic wall panel on the molded door frame and align the acrylic wall panel holes with the screw inserts.

3. Install the panel mounting screws in each of the 3 locations shown in [Figure 9-5 Panel mounting screws on page 310](#). Torque the screws to 1.6 Nm or hand tighten, plus 1/4 turn.

Figure 9-5 Panel mounting screws



4. If the bedside panel includes post snap hood hinge (bumpers), push the bumper into position as shown in [Figure 9-6 Post snap hood hinge \(bumper\) installation on page 310](#).

Figure 9-6 Post snap hood hinge (bumper) installation



5. Inspect the bedside panel for damaged or missing parts. Replace damaged or missing parts, or repair loose parts before you return the bedside panel to operation.
6. Remove the bedside panel from service if you cannot complete the reassembly instructions.
7. After reassembly and before patient use, return the bedside panel for cleaning and disinfection. Refer to the instructions in the user manual.

9.4 Testing the supply pressure alarm

To verify the operation of the blender supply pressure alarm on devices with a resuscitation system:

1. Set the blender to 60% oxygen.
2. Set the primary flow knob to 10 L/min.
3. Connect only 1 gas hose. Disconnect all other hoses.
4. Turn on the connected gas source.
5. Turn on the medical gas supply switch.

The alarm must whistle.

If the alarm does not operate, have the resuscitation system serviced.

9.5 Functional testers and patient simulators

NOTE

For Nellcor SpO₂ systems, handheld, battery-operated pulse simulation testers (SRC-MAX) are available from Nellcor. Speak to the Nellcor Technical Services Department at 1.800.635.5267 or to your local Nellcor representative.

You can use some models of commercially available bench top functional testers and patient simulators to verify the correct functionality of pulse oximeters, sensors, and cables. Although such devices can verify that the pulse oximeters, sensors, and cables are functional, they cannot give the necessary data to correctly evaluate the precision of the SpO₂ measurements of the system. To fully evaluate the precision of the SpO₂ measurements, at a minimum, the wavelength characteristics of the sensor must be accommodated and the complex optical interaction of the sensor and the tissue of the patient must be reproduced. These functions are beyond the scope of known bench top testers. SpO₂ measurement precision can only be evaluated in vivo by comparing pulse oximeter measurements with values traceable to the SpO₂ measurements obtained from arterial blood that is simultaneously sampled with a laboratory co-oximeter. Refer to the operator manual of the individual testing device for the procedures related to the model of the tester that is used.

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Chapter 10 Tools

10.1 Hand tools

The list that follows contains the necessary tools to do repair procedures:

- Phillips and flat-tip screwdrivers
- Pliers, needle-nose pliers
- Vise grips
- Common US and metric sockets, nut driver, open end and Allen wrenches
- Torque wrench that can torque to 21 lb-in. (2.37 N-m) and 345 lb-in. (39 N-m) for freestanding models
- Long forceps (freestanding only)
- Flashlight
- Stopwatch
- Digital multimeter (DMM)
- Safety analyzer
- Static control workstation and ESD strap
- Service tools
For details, see [10.2 Service tools on page 313](#).
- Patient simulator with pediatric ECG option
- Diagonal cutter or wire cutter
- T6 torx screwdrivers

10.2 Service tools

Table 10-1 Service tools

Part Number	Description
M1118361	Heater dish alignment laser kit (includes holder) (takes 3 #392 1.55V button cells or equivalent)
6600-0714-200	Light gray touch-up paint (Munsell .16GY8.56-0.44 chroma), 18 ml
2006036-001	Masimo SET 1 electrical leakage test cable
M1230051	Masimo SET 2 electrical leakage test cable
M1237129	Nellcor electrical leakage test cable
M1163421	Crank handle kit

For more information about the resuscitation system service tools, see the Resuscitation System service manual.

We recommend a straight-line laser level (with a 2 wall leveling function) or a combination of T-square and Plumb-bob to accurately align the heater in freestanding and wall mount warmer models.

Chapter 11 Specifications

11.1 Power requirements and accessory outlets

Table 11-1 Power requirements and accessory outlets

Power requirements	Accessory outlets
5.25 A @ 100v ~, 50/60 Hz	2 A @ 100v ~, 50/60 Hz
4.57 A @ 115/120v ~, 50/60 Hz	2 A @ 115/120v ~, 50/60 Hz
2.39 A @ 220v ~, 50/60 Hz	1 A @ 220v ~, 50/60 Hz
2.28 A @ 230v ~, 50/60 Hz	1 A @ 230v ~, 50/60 Hz
2.19 A @ 240v ~, 50/60 Hz	1 A @ 240v ~, 50/60 Hz

11.2 Operating environment

Table 11-2 Operating environment

	Specification
Temperature	18 to 30°C
Humidity	5 to 75% non-condensing relative humidity
Pressure	70 to 106 kPa
Altitude	Up to 10,000 ft (3048 m, 696 hPa)
Air velocity	Up to 0.3 m/sec

11.2.1 Storage conditions

Table 11-3 Storage conditions

	Specification
Temperature	-25 to 60°C
Humidity	0 to 85% non-condensing relative humidity
Pressure	50 to 106 kPa
Water ingress	IPX0: no protection against dust or water

11.2.2 Electrical specifications

Table 11-4 Electrical specifications

	Specification
Operation	Continuous
Device type (IEC 60601-1)	Class 1

Table 11-5 Applied parts

	Specification
Skin temperature probe	Type BF
SpO2 probe	Type BF
ECG electrodes	Type CF defibrillation proof
Mattress	Non-electrical

11.3 Shipping conditions

Table 11-6 Shipping conditions

	Specification
Temperature	-25 to 60°C
Humidity	0 to 85% non-condensing relative humidity
Pressure	50 to 106 kPa

11.4 User control settings

Table 11-7 User control settings

	Specification
Patient control temperature	34 to 37.5°C in 0.1°C increments
Radiant heater power	0 to 100% in 5% increments

11.5 Defibrillation proof, signal input/output, and installation specifications

Table 11-8

	Specification
Defibrillation proof	The applied parts area of the Giraffe Warmer, Panda Freestanding Warmer, and Panda Wall Mount Warmer is not defibrillation proof. The ECG electrode applied parts of the Panda iRes Warmer is defibrillation proof.
Signal input/output	RS-232 serial data
Installation	Non-permanent installation of equipment

11.6 System performance

Table 11-9 System

	Specification
Warmer expected lifetime and service life	Approximately 8 years ^{*1}
Heater element	360 Watts

Table 11-9 System (Table continued)

	Specification
Heater output	27 mW/cm ^{2*2}
VA rating	805 VA
Patient temperature measurement accuracy	± 0.3°C @ 30°C to 42°C
Skin temperature probe accuracy	± 0.1°C @ 30°C to 42°C
Observation light	2 dimmable 35W halogen bulbs; estimated life 3000 hours based on manufacturer's specifications
Procedure light	The procedure light intensity at the center of the spot when aimed at the center of the mattress (without scale installed), shall be at least 1000 lux and not more than 5500 lux; estimated life 2000 hours
Elevating base duty cycle	15%
Sound pressure level (audio tone alarm volume) range – measured in accordance with IEC 60601-1-8 (1 m from geometric center of control panel and 5 cm above the center of the mattress)	High priority alarm: 40 – 70 dBA Medium priority alarm: 25 – 65 dBA Information signal: 25 – 60 dBA

*1 The warmer lasts a minimum of 8 years in normal operation when operated, maintained, and serviced as described in the instructions supplied in the User Manual and *Panda™ Warmer Family and Giraffe™ Warmer Service Manual*.

With correct maintenance and repairs, the service life can be extended as long as service parts are available.

*2 See 11.6.2 Irradiance on page 318.

11.6.1 Weight scale performance (bedded only)

Table 11-10 Weight scale performance (bedded only)

	Specification
Functional range	300 g to 8 kg
Accuracy	± 10 g
Resolution	10g (Factory setting) or 5g (user selectable on non-EU scales) The resolution of scales distributed in the EU region vary depending on the scale revision: <ul style="list-style-type: none"> • Scales with revision 2.72 only have a resolution option of 10g. • Scales with revision 2.86 have a resolution of 5g for weights up to 5 kg and a resolution 10g for weights from 5 kg to 8 kg. • The resolution on EU scales with software 2.86 and above is not user selectable.

For the European Union (EU) and the European Free Trade Association (EFTA) member states in Europe, check with your local regulations with respect to the Non-Automated Weighing Instrument (NAWI) directive as to the process and frequency for scale calibration. The resolution of scales distributed in this EU region only have a resolution option of 10g.

11.6.2 Irradiance

Table 11-11 Irradiance

	50% heater power*1	100% heater power*1*2
Bedded warmer	12 ± 2 mW/cm ²	31 ± 3 mW/cm ²
Non-bedded warmer (highest bassinet)	12 ± 2 mW/cm ²	31 ± 3 mW/cm ²

*1 The values given are at 35% RH (relative humidity) and 20°C temperature.

*2 The irradiance at 100% heater power can go down to 27 mW/cm² with the age of the warmer.

11.7 Mechanical specifications

Table 11-12 Mechanical specifications (bedded only)

	Specification
Height	193 (minimum) to 218 cm (maximum)
Width	64 cm
Depth	119 cm
Weight	100 kg
Panda mattress size	66 x 48 x 2 cm
Giraffe mattress size	65 x 48 x 4 cm
Bed tilt	±12° continuous tilt
Maximum patient weight	14 kg

Table 11-13 Mechanical specifications (freestanding only)

	Specification
Height	195 cm
Width	85 cm
Depth	77 cm
Weight	43 kg

Table 11-14 Mechanical specifications (wall-mount only)

	Specification
Height	69 cm
Width	40 cm
Depth	49 cm
Weight	15 kg

Table 11-15 T-piece and Bag and Mask resuscitation system physical characteristics

	Specification
Depth	25 cm knobs to fittings
Height	34 cm
Width	25 cm
Weight	Approximately 9 kg with blender

11.7.1 Accessories (bedded only)

Table 11-16 Accessories (bedded only)

	Specification
Storage drawer package	6.8 kg maximum load
Drawer instrument shelf	3.6 kg maximum load
Rotating IV pole	9 kg maximum load
IV pole 12 inch	15 kg maximum load
IV pole 24 inch	15 kg maximum load
Instrument shelf	9 kg maximum load
DIN rail	3 kg maximum load

11.8 Nellcor SpO2 specifications

Accuracy specifications are based on controlled hypoxia studies in healthy non-smoking adult volunteers over the specified saturation SpO2 range(s) conducted by Covidien. The volunteers were male and female individuals between 18 and 50 years of age with varied skin pigmentation and were selected from local population. Pulse oximeter SpO2 measurements were compared to SpO2 values of drawn blood samples measured by hemoximetry. All accuracies are expressed as \pm "X" digits. Pulse oximeter equipment measurements are statistically distributed. Approximately 2/3 of pulse oximeter measurements can be expected to fall in this accuracy (A_{RMS}) range.

Pulse rate measurement accuracy in the presence of low perfusion (detected IR pulse modulation amplitude 0.03% to 1.5%) was validated with signals supplied by a patient simulator. SpO2 and pulse rate values were varied across the monitoring range over a range of weak signal conditions and compared to the known true saturation and pulse rate of the input signals.

Table 11-17 Nellcor SpO2 specifications

	Specification
Measurement range	<ul style="list-style-type: none"> SpO2: 1 to 100% SpO2 Pulse rate: 20 to 300 bpm
Accuracy	<ul style="list-style-type: none"> SpO2: from 70 to 100% SpO2, $\pm 3\%$ for neonates Below 69%, unspecified Pulse rate, no motion: ± 3 bpm
Wavelengths and power	Nominally 660 nm and 900 nm with total optical output power of the sensor LEDs less than 15 mW

Table 11-17 Nellcor SpO2 specifications (Table continued)

	Specification
Data update period	At maximum averaging time, the data is updated in less than 30 seconds. Shorter averaging times reduce this update period.
Alarms	User selectable upper and lower limits for SpO2 and pulse rates
Standards	Designed to ISO 80601-2-61 with the exclusion to clause 201.15.3.5.101.1 with regard to shock and vibration

11.9 Masimo SpO2 specifications

Sensor accuracy refers to accuracy specified when the sensor is used with Masimo pulse oximetry modules that use PC or LNC series patient cables. Numbers represent ± 1 standard deviation, which represents 68% of the population.

The Masimo SpO2 parameter with sensors is validated for no motion accuracy in human blood studies on healthy adult volunteers in induced hypoxia studies in the range of 70 to 100% SpO2 against a laboratory co-oximeter and ECG monitor. This variation equals ± 1 standard deviation, which encompasses 68% of the population. 1% was added to the accuracies for neonatal/infant sensors to account for accuracy variation due to properties of fetal hemoglobin.

The Masimo SpO2 parameter with sensors is validated for motion accuracy in human blood studies on healthy adult volunteers in induced hypoxia studies while performing rubbing and tapping motions at 2 to 4 Hz at an amplitude of 1 to 2 cm and a nonrepetitive motion before 1 to 5 Hz at an amplitude of 2 to 3 cm in induced hypoxia studies in the range of 70 to 100% SpO2 against a laboratory co-oximeter and ECG monitor. This variation equals ± 1 standard deviation, which encompasses 68% of the population. Masimo technology with sensors is validated with human blood studies on healthy adult volunteers with induced hypoxia studies. The volunteers were male and female individuals between 22 and 40 years of age with a range of skin pigmentations from light to dark. 1% was added to the accuracies for neonatal/infant sensors to account for the accuracy variation due to properties of fetal hemoglobin.

The Masimo SpO2 parameter is validated for low perfusion accuracy in bench top testing against a Biotek Index 2 simulator and Masimo simulator with signal strengths of more than 0.02% and a percent transmission of more than 5% for saturations from 70 to 100%. This variation equals ± 1 standard deviation, which encompasses 68% of the population.

Because pulse oximeter equipment measurements are statistically distributed, only approximately 2/3 of pulse oximeter equipment measurements can be expected to fall in $\pm A_{rms}$ of the value measured by a co-oximeter.

Pulse rate accuracy is validated for the range of 25 to 240 bpm in bench top testing against a Biotek Index 2 simulator. This variation equals ± 1 standard deviation, which encompasses 68% of the population.

Table 11-18 Masimo SpO2 specifications

	Specification
Measurement range	<ul style="list-style-type: none"> SpO2: 30 to 100% SpO2 Pulse rate: 25 to 240 bpm
Wavelengths	<ul style="list-style-type: none"> Red: 660 nm, nominal Infrared: 905 nm, nominal

Table 11-18 Masimo SpO2 specifications (Table continued)

	Specification
Maximum optical output power Radiant power at 50 mA pulsed	0.13 mW, minimum 0.79 mW, maximum
Accuracy	<ul style="list-style-type: none"> SpO2: from 70 to 100% SpO2, $\pm 3\%$ for neonates Below 69%, unspecified Pulse rate, no motion: ± 3 bpm Pulse rate, motion: ± 5 bpm
Data update period	At maximum averaging time, the data is updated in less than 30 seconds. Shorter averaging times reduce this update period.
Alarms	User selectable upper and lower limits for SpO2 and pulse rates
Standards	Designed to ISO 80601-2-61 with the exclusion to clause 201.15.3.5.101.1 with regard to shock and vibration

11.10 T-piece resuscitation specifications

Table 11-19 T-piece resuscitation specifications

	Specification
Recommended body weight range	Up to 10 kg
Gas supply characteristics: For integrated resuscitation units with 6-digit serial numbers	Low-pressure gas source: <ul style="list-style-type: none"> Input pressure: 275 to 517 kPa (40 to 75 psi) Gas supply minimum flow rating: 70 L/min High-pressure cylinders: <ul style="list-style-type: none"> 3000 psi (200 bar) maximum
Gas supply characteristics: For integrated resuscitation units with 9-digit serial numbers	Low-pressure gas source: <ul style="list-style-type: none"> Input pressure: 275 to 600 kPa (40 to 87 psi) Gas supply minimum flow rating: 70 L/min High-pressure cylinders: <ul style="list-style-type: none"> 3000 psi (200 bar) maximum
Venturi vacuum subsystem	<ul style="list-style-type: none"> Range: 0 to 150 mm Hg (0 to 20 kPa) Accuracy: $\pm 5\%$ of full scale
Adjustable PIP (T-piece system only)	<ul style="list-style-type: none"> Maximum PIP: 45 ± 5 cm H₂O Override: $> 30 \pm 4$ cm H₂O Flow capacity: 15 L/min
Adjustable PEEP ranges (located on the T-piece circuit)	<ul style="list-style-type: none"> @ 5 L/min minimum PEEP <5 cm H₂O @ 8 L/min minimum PEEP <5 cm H₂O @ 10 L/min minimum PEEP <5 cm H₂O @ 15 L/min minimum PEEP <6 cm H₂O

Table 11-19 T-piece resuscitation specifications (Table continued)

	Specification
Flowmeters	<ul style="list-style-type: none"> • Range: 0 to 15 L/min • Accuracy: <ul style="list-style-type: none"> • 0 to 5 L/min \pm 0.5 L/min • 5 to 10 L/min \pm 1.5 L/min • 10 to 15 L/min \pm 2 L/min
Secondary gas outlet pressure	20 \pm 2 psi (138 \pm 14 kPa)
Air/oxygen blender	<ul style="list-style-type: none"> • Range: 21 to 100% O₂ • Accuracy: \pm5% of full scale
Airway pressure manometer	<ul style="list-style-type: none"> • Display range: -10 to 80 cm H₂O • Accuracy: \pm5% of full scale
Approximate operating time with an E-cylinder (680 liters) and suction off	<p>With a blend of 50% air and 50% O₂</p> <ul style="list-style-type: none"> • @ 5 L/min: 121 minutes • @ 10 L/min: 74 minutes • @ 15 L/min: 54 minutes <p>With a blend of 15% air and 85% O₂</p> <ul style="list-style-type: none"> • @ 5 L/min: 94 minutes • @ 10 L/min: 58 minutes • @ 15 L/min: 42 minutes
Tubing	<p>Diameter: 6 mm (0.25 in)</p> <p>Length: 91.5 \pm 2.5 cm (36 \pm 1 in)</p>
T-piece dead space ^{*1}	<p>Vyaire:</p> <ul style="list-style-type: none"> • T-Piece Disposable Circuit Kit with Mask Size 0: 28 \pm 0.8 mL • T-Piece Disposable Circuit Kit with Mask Size 1: 55.6 \pm 3.8 mL <p>Flexicare:</p> <ul style="list-style-type: none"> • T-Piece Disposable Circuit only: 1.4 mL • T-Piece Disposable Circuit Kit with Mask Size 0: approximately 22 mL • T-Piece Disposable Circuit Kit with Mask Size 1: approximately 43 mL

*1 The T-piece dead space is a volume vetted by inhaled and exhaled gases. The dead space was measured on a flat plan.

11.11 Bag and Mask resuscitation specifications

Table 11-20 Bag and Mask resuscitation specifications

	Specification
Recommended body weight range	Up to 10 kg

Table 11-20 Bag and Mask resuscitation specifications (Table continued)

	Specification
Gas supply characteristics: For integrated resuscitation units with 6-digit serial numbers	Low-pressure gas source: <ul style="list-style-type: none"> • Input pressure: 275 to 517 kPa (40 to 75 psi) • Gas supply minimum flow rating: 70 L/min High-pressure cylinders: <ul style="list-style-type: none"> • 3000 psi (200 bar) maximum
Gas supply characteristics: For integrated resuscitation units with 9-digit serial numbers	Low-pressure gas source: <ul style="list-style-type: none"> • Input pressure: 275 to 600 kPa (40 to 87 psi) • Gas supply minimum flow rating: 70 L/min High-pressure cylinders: <ul style="list-style-type: none"> • 3000 psi (200 bar) maximum
Venturi vacuum subsystem	<ul style="list-style-type: none"> • Range: 0 to 150 mm Hg (0 to 20 kPa) • Accuracy: $\pm 5\%$ of full scale
Flowmeters	<ul style="list-style-type: none"> • Range: 0 to 15 L/min • Accuracy: <ul style="list-style-type: none"> • 0 to 5 L/min ± 0.5 L/min • 5 to 10 L/min ± 1.5 L/min • 10 to 15 L/min ± 2 L/min
Gas outlet pressure	20 \pm 2 psi (138 \pm 14 kPa)
Air/oxygen blender	<ul style="list-style-type: none"> • Range: 21 to 100% O₂ • Accuracy: $\pm 5\%$ of full scale
Airway pressure manometer	<ul style="list-style-type: none"> • Display range: -10 to 80 cm H₂O • Accuracy: $\pm 5\%$ of full scale
Approximate operating time with an E-cylinder (680 liters) and suction off	With a blend of 50% air and 50% O ₂ <ul style="list-style-type: none"> • @ 5 L/min: 121 minutes • @ 10 L/min: 74 minutes • @ 15 L/min: 54 minutes With a blend of 15% air and 85% O ₂ <ul style="list-style-type: none"> • @ 5 L/min: 94 minutes • @ 10 L/min: 58 minutes • @ 15 L/min: 42 minutes
Tubing	Diameter: 6 mm (0.25 in) Length: 91.5 \pm 2.5 cm (36 \pm 1 in)

11.12 ResusView Heart Rate Option specifications

Table 11-21 ResusView Heart Rate Option specifications

	Specification
Measurement range	30 – 300 beats per minute (bpm) ^{*1}

Table 11-21 ResusView Heart Rate Option specifications (Table continued)

		Specification
Accuracy		±1% or 1 bpm whichever is greater for the display range (30 – 300 bpm) and QRS pulse width (15 - 90 ms)
Data update period		Every second
Housing classification		IPX0
Heart rate averaging		12 second median algorithm
Response time of HR meter to change in heart rate		80 to 120 bpm change displayed in 8 seconds; 80 to 40 bpm change displayed in 12 seconds (as per IEC 60601-2-27 clause 201.7.9.2.9.101 b) 5), Figure 201.101)
Electrical type	Skin temperature probe	BF
	SpO2	BF
	ECG	CF
ECG electrode AC current sensing for lead-off detection	Active patient electrode	3nAp-p typical (each)
	AC lead-off carrier frequency	500 Hz
Right Leg Drive (RLD) for active noise suppression	Common mode reference electrode	<30 µ Amps
ECG QRS amplitude		>= 350 µV and <=5 mV
ECG QRS pulse width		>=15 ms and <= 90 ms
Waveform scale		0.2X, 0.5X, 1X, or 2X Factory default is 1X (adjustable only in the Service Mode).
Waveform speed		12.5 mm/sec or 25 mm/sec Factory default is 25 mm/sec (adjustable only in the Service Mode).
Heart rate response to irregular heart rate rhythms		Heart rate calculation operates with irregular heart rate rhythms of IEC 60601-2-27 Clause 201.7.9.2.9.101 b) 4) as follows: Ventricular bigeminy: varying HR between 60 bpm to 80 bpm Slow alternating ventricular bigeminy: varying HR between 55 bpm to 60 bpm Rapid alternating ventricular bigeminy: varying HR between 110 bpm to 130 bpm. Bidirectional systoles: varying HR between 80 bpm to 105 bpm

*1 Detection limits are 20 to 340 bpm, outside of which there is a brief transition period (5 to 30 seconds) required for normal detection. During this transition period, “- -” or occasional numbers will be displayed as the system is adapting, which may not reflect actual heart rate. Refer to the waveform for the heart rate information if “- -” is displayed.

Table 11-22 Maximum tall T-wave rejection capability (with 1 mV QRS test signal per IEC 60601-2-27) as follows:

T-wave amplitude	QRS duration
<=1.25 mV	15 up to 70 msec
<=0.4 mV	71 up to 75 msec
<=0.2 mV	76 up to 90 msec

Lead Off is detected by injecting a constant current (83 nA) 500 Hz sine wave into each electrode.

11.13 Alarm priorities

The alarms have 1 of 3 priorities. The color of the alarm message and the audio tones identify the priority of the alarm.

Colors and flashes

When an alarm activates, the alarm message flashes on the control panel screen and the indicator light at the top of the control panel comes on. The color of the alarm message on the control panel screen and the speed at which the alarm message flashes identify the alarm priority. The indicator light at the top of the control panel identifies the source of the alarm when more than 1 device is in the same area. An alarm indicator also flashes on the control panel screen.

Table 11-23 Alarm message colors

Priority	Alarm message color	Flash speed	Description
High	Red	Fast (1.4 to 2.8 Hz)	Requires immediate attention
Medium	Yellow	Medium (0.4 to 0.8 Hz)	Alert, but does not require immediate attention
Low	Yellow	No flash, on continuously	Does not require immediate attention

Audio tones

Audio tones are different for each alarm priority. The table that follows gives the audio signals for each alarm priority.

Table 11-24 Alarm audio tones

Priority	Pulse/Sound	Description
High	10 pulses with sound	Requires immediate attention
Medium	3 pulses with a different sound and slower pace than the High alarm priority	Alert, but does not require immediate attention
Low	No sound	Does not require immediate attention
Information signal	1 bell-like tone that starts again at 8 second intervals	Informational and does not require immediate attention

When an alarm activates, all other audio tones stop.

11.14 Alarm hierarchy

Table 11-25 Alarms

Alarm hierarchy	Alarm	Activation criteria	Indication	Silence period	Priority	Mode
1	HR System Failure ^{*1}	The HR module does not communicate with the main processor for a minimum of 30 seconds. If HR is ON, this timeout decreases to 5 seconds.	Display/ Light/Audio	–	High	Baby Manual
2	Oximetry System Failure	The SpO2 system does not communicate with the main processor for a minimum of 2 seconds.	Display/ Light/Audio	–	High	Baby Manual
3	Low Pulse Rate	The pulse rate is less than the set value.	Display/ Light/Audio	2 minutes	High	Baby Manual
4	Low SpO2	The blood oxygen saturation is less than the set value. (This alarm is subject to SatSeconds alarm delays for the Nellcor SpO2 system.)	Display/ Light/Audio	2 minutes	High	Baby Manual
5	Check Baby - Heat Off	The radiant heater operates at 100% power for more than 15 minutes and the Check Baby alarm is not resolved for 3 minutes.	Display/ Light/Audio	15 minutes	High	Baby
6	Check Baby - Heat Off	The radiant heater operates at more than 25% ^{*2} power for more than 15 minutes and the Check Baby alarm is not resolved for 3 minutes.	Display/ Light/Audio	15 minutes	High	Manual
7	Baby Hot - Check Temp Probe	The Baby Temp is 2.0°C ^{*3} more than the Set Temp.	Display/ Light/Audio	5 minutes	High	Baby
8	Baby Cold - Check Temp Probe	The Baby Temp is 2.0°C ^{*3} less than the Set Temp.	Display/ Light/Audio	5 minutes	High	Baby
9	Check Baby	The radiant heater operates at 100% power for more than 12 minutes.	Display/ Light/Audio	12 minutes	Medium	Baby
10	Check Baby	The radiant heater operates at more than 25% ^{*2} power for more than 12 minutes.	Display/ Light/Audio	12 minutes	Medium	Manual
11	Temp. Probe Failure	The difference between the probe thermistors is 0.5°C ^{*3} or more.	Display/ Light/Audio	2 minutes	Medium for 30 seconds then High	Baby Manual (when the Man. Temp Alarm is set)

Table 11-25 Alarms (Table continued)

Alarm hierarchy	Alarm	Activation criteria	Indication	Silence period	Priority	Mode
12	Confirm Probe Jack Connection	No skin temperature probe is connected to the skin temperature probe jack.	Display/ Light/Audio	2 minutes	Medium for 30 seconds then High	Baby Manual (when the Man . Temp Alarm is set)
13	Baby Hot - Check Temp Probe	The Baby Temp is 1.0°C* ³ more than the Set Temp.	Display/ Light/Audio	12 minutes	Medium	Baby Manual (when the Man . Temp Alarm is set)
14	Baby Cold - Check Temp Probe	The Baby Temp is 1.0°C* ³ less than the Set Temp.	Display/ Light/Audio	12 minutes	Medium	Baby Manual (when the Man . Temp Alarm is set)
15	No SpO2 Probe	The SpO2 probe is disconnected from the SpO2 probe jack.	Display/ Light/Audio	2 minutes	Medium for 10 seconds then High	Baby Manual
16	Check SpO2	The SpO2 system identifies a defective probe.	Display/ Light/Audio	2 minutes	Medium for 10 seconds then High	Baby Manual
17	Check SpO2	The Masimo SpO2 system identifies interference. (The Nellcor SpO2 system uses alerts to identify interference so the Nellcor SpO2 system does not map to this alarm.)	Display/ Light/Audio	2 minutes	Medium for 10 seconds then High	Baby Manual
18	SpO2 Probe Off Baby	The SpO2 probe is not attached to the patient.	Display/ Light/Audio	2 minutes	Medium for 10 seconds then High	Baby Manual
19	Check SpO2	The Masimo SpO2 system senses too much ambient light. (The Nellcor SpO2 system does not have an analog for this alarm.)	Display/ Light/Audio	2 minutes	Medium for 10 seconds then High	Baby Manual
20	Unrecognized SpO2 Probe	The attached SpO2 probe is not compatible with the Masimo SpO2 system. (The Nellcor SpO2 system does not have an analog for this alarm.)	Display/ Light/Audio	2 minutes	Medium for 10 seconds then High	Baby Manual
21	High Pulse Rate	The pulse rate is more than the set value.	Display/ Light/Audio	2 minutes	High	Baby Manual

Table 11-25 Alarms (Table continued)

Alarm hierarchy	Alarm	Activation criteria	Indication	Silence period	Priority	Mode
22	High SpO2	The blood oxygen saturation is more than the set value. (This alarm is subject to SatSeconds alarm delays for the Nellcor SpO2 system.)	Display/ Light/Audio	2 minutes	High	Baby Manual
23	Callback Timer Complete	The callback timer decreases to 0.	Display/ Light/Audio	No realarm	Medium	Baby Manual
24	HR Lead Off ^{*4}	2 or more electrodes do not touch the patient skin or the reference electrode (RA) does not touch the patient skin.	Display/ Light/No Audio	–	Low	Baby Manual

*1 The HR System Failure alarm has priority over other high-priority system alarms.

*2 Service personnel can change the default 25% setting (5 to 50% in 5% increments) for Manual Mode. When the heater power is less than 25%, the Check Baby alarm is disabled and a notification shows on the screen.

*3 °C are shown here. °F are shown on the screen if it is applied in the Setup menu.

*4 The screen does not show heart rate value or HR Lead Off alarm during the weighing sequence of the patient or when SpO2 alarm limit is selected on the settings menu.



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