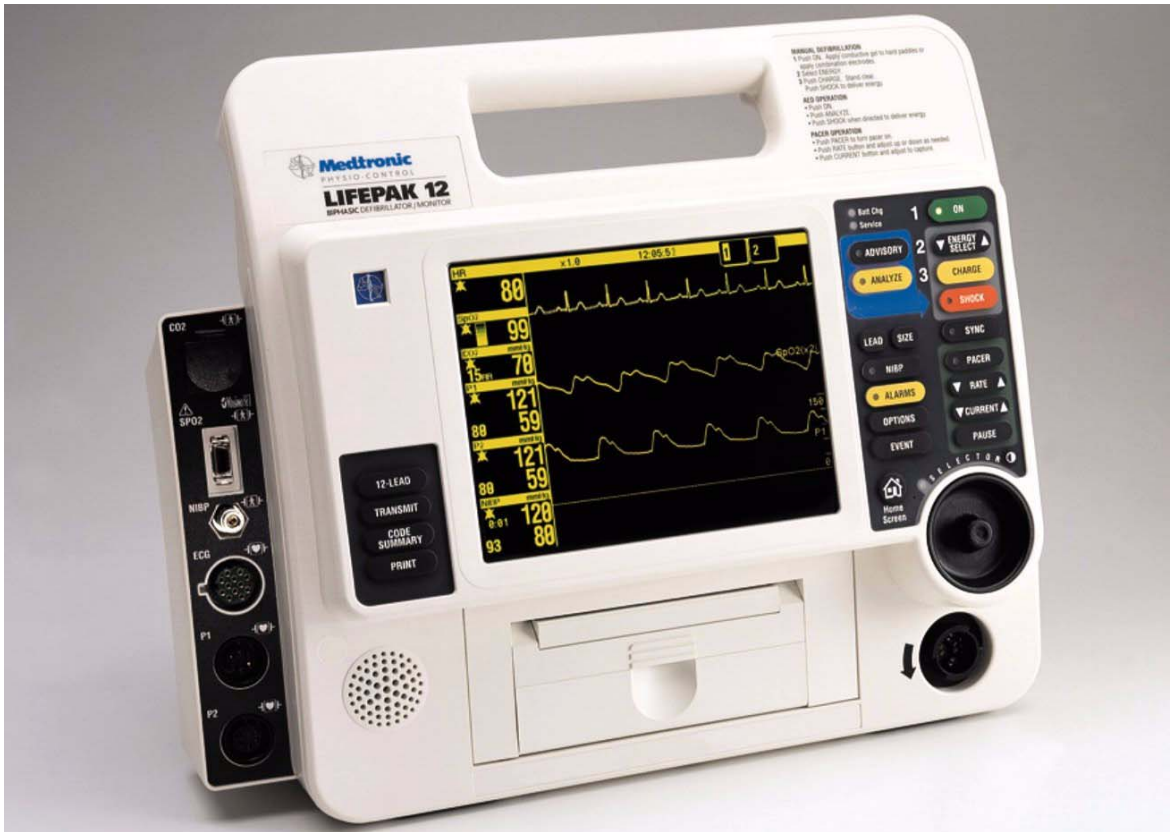
Medtronic

LIFEPAK® 12 Defibrillator/Monitor Series

Service Manual



Click a Topic

Preface

This service manual describes how to maintain, test, troubleshoot, and repair the LIFEPAK® 12 defibrillator/monitor. A separate publication, the **LIFEPAK 12 Defibrillator/Monitor Series Operating Instructions**, is for use by physicians, clinicians, and emergency care providers. The operating instructions provide step-by-step instructions as well as operator-level testing and maintenance.

Note: Hyperlinks appear in **Blue Text**. Text that indicates a control, menu, message, or screen overlay appears as small caps. For example, ADVISORY control and SETUP menu.

This section covers the following topics:

Trademarks

MIN 3010013-019 CAT. 21300-006152

Service Personnel Qualifications

Service technicians who service the device must be properly qualified and thoroughly familiar with the operation of the LIFEPAK 12 defibrillator/monitor. service technicians must meet at least one of the following requirements (or the equivalent):

- Associate of Applied Science, with an emphasis in biomedical electronics
- Certificate of Technical Training, with an emphasis in biomedical electronics
- Equivalent biomedical electronics experience

Contacting Medtronic

Medtronic Emergency Response Systems
11811 Willows Road Northeast
Redmond, WA 98052-2003 USA
Telephone: 1.425.867.4000
Toll Free (USA only): 1.800.442.1142
Fax: 1.425.867.4121
Internet: **www.medtronic-ers.com**
www.medtronic.com

Medtronic Europe S.A.
Medtronic Emergency Response Systems
Rte du Molliau 31
Case postale 84
1131 Tolochenaz
Switzerland
Telephone: 41.21.802.7000
Fax: 41.21.802.7900

Responsibility for Information

This service manual describes the methods required to maintain, test, and repair the LIFEPAK 12 defibrillator/monitor. This manual does not address the operation of the LIFEPAK 12 defibrillator/monitor. Qualified service personnel must consult both the LIFEPAK 12 Defibrillator/Monitor Series Operating Instructions and the LIFEPAK 12 Defibrillator/Monitor Series Service Manual to obtain a complete understanding of the use and maintenance of the device.

It is the responsibility of our customers to ensure that the appropriate person(s) within their organization have access to the information in this service manual, including any warnings and cautions used throughout the LIFEPAK 12 Defibrillator/Monitor Series Service Manual.

Device Tracking

!USA Device Tracking:

The U.S. Food and Drug Administration requires defibrillator manufacturers and distributors to track the location of their defibrillators. If your defibrillator has been sold, donated, lost, stolen, exported, or destroyed or if it was not obtained directly from Medtronic, please notify the device tracking coordinator at 1.800.442.426.4488.

Refer to your LIFEPAK 12 Defibrillator/Monitor Series Operating Instructions for detailed instructions concerning device tracking.

Service Information

Before attempting to clean or repair any assembly in this device, the service technician should be familiar with the information provided in the **Preventive Maintenance** section.

A qualified service technician should inspect any defibrillator that has been dropped, damaged, or abused to verify that the device is operating within performance standards listed in the **Performance Inspection Procedure (PIP)**, and that the leakage current values are acceptable.

Replacement procedures for the LIFEPAK 12 defibrillator/monitor are limited to those items accessible at the final assembly level. Replacements and adjustments must be made by **service personnel** qualified by appropriate training and experience. Replacements at the final assembly level simplify repair and servicing procedures, and help ensure correct device operation and calibration.

To obtain Medtronic service and maintenance for your LIFEPAK 12 defibrillator/monitor, contact your local service or sales representative. In the USA, call Medtronic Service at 1.800.442.1142. Outside the USA, contact your local Medtronic representative.

Recycling Information

Recycle the device at the end of its useful life.

- Recycling Assistance – The device should be recycled according to national and local regulations. Contact your local Medtronic representative for assistance.
- Preparation – The device should be clean and contaminant-free prior to being recycled.
- Recycling of Disposable Electrodes – After using disposable electrodes, follow your local clinical procedures for recycling.
- Recycling of Batteries – The device uses rechargeable FASTPAK, FASTPAK 2 NiCd (Nickel-Cadmium) and LIFEPAK NiCd, and LIFEPAK SLA (sealed lead-acid) batteries. Follow local guidelines and instructions given in this service manual for **discarding/recycling batteries**.
- Packaging – Save or recycle packaging materials.

Warranty

Refer to the warranty statement included in the **operating instructions – Maintaining the Equipment**.

Configuration Information

This service manual is relevant for existing LIFEPAK 12 defibrillator/monitor series devices and options through the following revisions:

- LIFEPAK 12 Monophasic Basic Device with LCD Display and 3-Lead ECG
- LIFEPAK 12 Biphasic Basic Device with LCD Display and 3-Lead ECG
- Pacing Option
- Nellcor® SpO2 Option

  – or –

- Masimo® SpO2 Option
- 12-Lead ECG Option
- NIBP Monitoring Option
- Oridion EtCO2 Option
- Fax/Data Communication Option
- Bluetooth Communication Option
- 100MM Printing Option
- ElectroLuminescent (EL) Display Option
- Invasive Pressure Option
- Vital Signs Trending Option
- Voice Recording Accessory Option

Glossary

The following are definitions of terms used throughout this service manual.

- ADAPTIV™ biphasic — Property of the shock waveform generated by the LIFEPAK 12 defibrillator/monitor with biphasic technology. The biphasic waveform is characterized by a positive current phase followed by a reverse current phase of shorter duration and decreased magnitude. The waveform pulse characteristic is biphasic truncated exponential (BTE).
- Automated External Defibrillator (AED) — The LIFEPAK 12 defibrillator/monitor uses an ECG analysis Shock Advisory System (SAS) to advise the device operator if it detects a shockable or nonshockable rhythm. For more information about CPSS and SAS, refer to the **operating instructions – Shock Advisory System**.
- CODE SUMMARY™ Report — A summary report that includes the ECG segments associated with kdy events such as analysis or shock. refer to the **operating instructions – Data Management** for a sample CODE SUMMARY Report.

(Continued on next page)

Glossary *(continued)*

- Continuous Patient Surveillance System (CPSS) — A feature that monitors the patient ECG in LEADS or PADDLES for a potentially shockable rhythm. CPSS is active when the front panel ADVISORY indicator is on (AED mode) or the VF/VT ALARM is selected after pressing the ALARMS control (manual mode). The CPSS operates in conjunction with the Shock Advisory System (SAS). For more information about CPSS and SAS, refer to the **operating instructions – Shock Advisory System**.
- End-Tidal Carbon Dioxide (EtCO2) — A noninvasive capnometer that monitors EtCO2, FiCO2, and respiration rate.
- Event Log Summary — A report summarizing important events for a particular patient record; part of the CODE SUMMARY Report.
- FAST-PATCH™ disposable defibrillation/ECG electrodes — An electrode system that allows delivery of defibrillation therapy to the patient.
- Monophasic — Property of the shock waveform generated by the LIFEPAK 12 defibrillator/monitor with monophasic technology. The monophasic pulse characteristic is monophasic damped sinusoid (MDS) per AAMI DF2-1989 3.2.1.5.1.
- Noninvasive Blood Pressure (NIBP) — An optional meter that checks systolic, diastolic, and mean arterial blood pressure, along with pulse rate.

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Glossary *(continued)*

- QUIK-COMBO™ pacing/defibrillation/ECG electrodes — An electrode system that allows delivery of pacing and defibrillation therapy to the patient.
- QUIK-COMBO patient simulator — A combination lead tester/patient cardiac rhythm simulator. The simulator is designed for use in training clinical personnel in the operation of the LIFEPAK 12 defibrillator/monitor.
- REDI-PAK™ preconnect system — A variant of the QUIK-COMBO pacing/defibrillation/ECG electrodes system. The system allows QUIK-COMBO pacing/defibrillation/ECG electrode cable connection without removing the electrodes from their airtight sealed pouch until needed.
- Shock Advisory System (SAS) — A computerized ECG analysis system for use in the detection of a shockable rhythm. For more information about CPSS and SAS, refer to the **operating instructions – Shock Advisory System**.
- SpO2 — A noninvasive pulse oximeter that checks the saturation of oxygen in arterial blood.
- Test Load — A device that provides an external defibrillation test load for the defibrillator/monitor. The test load connects to the patient connector on the device.

Acronyms

The following is a list of acronyms and abbreviations used in this manual.

Term	Description
AAMI	Association for the Advancement of Medical Instrumentation
ADC	Analog-to-Digital Conversion
AED	Automated External Defibrillator
AHA	American Heart Association
AMI	Acute Myocardial Infarction
ANSI	American National Standards Institute
ASIC	Application-Specific Integrated Circuit
BTE	Biphasic Truncated Exponential
BF	Electrically isolated, external body connection
BPM	Beats Per Minute
CF	Electrically isolated, direct cardiac connection
CPR	Cardiopulmonary Resuscitation
CPU	Central Processing Unit
CPSS	Continuous Patient Surveillance System
DDE	Disposable Defibrillation Electrodes

(Continued on next page)

Acronyms *(continued)*

Term	Description
DSP	Digital Signal Processor
DUART	Dual Universal Asynchronous Receiver/Transmitter
DMM	Digital Multimeter
ECG	Electrocardiogram
EL	ElectroLuminescent
EMS	Emergency Medical Service
ESCC	Energy Storage Capacitor Charger
ESD	Electrostatic Discharge
ESU	Electrosurgical Unit
EtCO2	End-Tidal Carbon Dioxide
FiCO2	Inspired Carbon Dioxide
HR	Heart Rate
IEC	International Electrical Commission
IP	Invasive Pressure
LCD	Liquid Crystal Display
LED	Light Emitting Diode
MDS	Monophasic Damped Sinusoidal

(Continued on next page)

Acronyms *(continued)*

Term	Description
MMHg	Millimeters of Mercury
NIBP	Noninvasive Blood Pressure
NiCd	Nickel-Cadmium (battery)
NHAAP	National Heart Attack Alert Program
NSR	Normal Sinus Rhythm
OEM	Original Equipment Manufacturer
RR	Respiration Rate
PC	Personal Computer
PCB	Printed Circuit Board
PCMCIA	Personal Computer Memory Card International Association
PIP	Performance Inspection Procedure
PPM	Pulses Per Minute
QRS	Refers to portions of the ECG waveform
RISC	Reduced Instruction Set Computer
RTC/NVRAM	Real Time Clock/Non-Volatile Random-Access Memory
RTS	Radio Transparent System
SAS	Shock Advisory System

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Acronyms *(continued)*

Term	Description
SLA	Sealed Lead-Acid (battery)
SpO2	Pulse Oximeter reading (saturation of oxygen in arterial blood)
SSD	Static-Sensitive Device
TCP	Test and Calibration Procedure
VF	Ventricular Fibrillation
VT	Ventricular Tachycardia
µA	MicroAmpere

Safety

This section describes the general safety conventions, terms, and symbols used in this service manual or on the LIFEPAK 12 defibrillator/monitor front and rear panels. This information is intended to alert service personnel to recommended precautions in the care, use, and handling of this medical device.

Terms

The following terms are used in this service manual or on the various configurations of the LIFEPAK 12 defibrillator/monitor. Familiarize yourself with their definitions and significance.

Danger: Immediate hazards that will result in serious personal injury or death.

Warning: Hazards or unsafe practices that could result in serious personal injury or death.

Caution: Hazards or unsafe practices that could result in device or property damage.

Note: Points of particular interest for more efficient or convenient device operation; additional information or explanation concerning the subject under discussion.

General Warnings and Cautions

The following are general warnings and cautions. Keep these warnings and cautions in mind when working with the LIFEPAK 12 defibrillator/monitor. More specific warnings and cautions appear throughout this service manual and the LIFEPAK 12 Defibrillator/Monitor Series Operating Instructions.

WARNINGS!

Possible fire or explosion. Do not service this device in the presence of flammable gases, anesthetics, or oxygen sources.

Shock or fire hazard. Do not immerse any portion of this device in water or other fluids. Avoid spilling any fluids on the device or accessories. If the device is ever immersed in water or other fluids, remove the batteries and disconnect input power source from any attached ac or dc power adapter until the device can be serviced.

Patient hazard. Do not mount the device directly above patient. Place the device in a location where it cannot harm the patient should it fall from its shelf or other mount.

Shock or fire hazard. Equipment or accessories improperly interconnected to each other can be a source of ignition or cause a shock. Make sure that all equipment is interconnected safely.

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General Warnings and Cautions *(continued)*

WARNING!

Shock hazard. Servicing of this device must be performed by properly trained individuals. This device may retain potentially lethal charges accessible inside the device at any time–even when off. Follow procedures carefully for discharging the A15 Energy Storage Capacitor and the Pacing Capacitor on the A04 Therapy PCB.

CAUTIONS!

Possible equipment damage. This device may be damaged by mechanical or physical abuse such as immersion in water or dropping. If the device has been abused, remove it from use and contact qualified service personnel.

Possible device damage. To help prevent component damage, do not mount the device near vibration sources such as engine struts or landing gear.

Symbols

The following list includes symbols that may be used in this Service Manual or on various configurations of the LIFEPAK 12 defibrillator/monitor and accessories. Some symbols may not be relevant to your device or used in every country.


Defibrillation-proof type CF connection


Defibrillation protected, type BF patient connection


Attention, consult accompanying documents


Warning, high voltage


Biphasic defibrillation shock


Type BF patient connection


Static-sensitive device (SSD)

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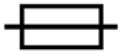
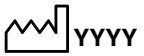
Symbols *(continued)*

	Safety Class II equipment (reinforced insulation)
	Type B equipment
	Fuse
+	Positive terminal
–	Negative terminal
LOT YYWW	Lot number (batch code)
	Use By date shown: yyyy-mm-dd or yyyy-mm
REF	Reorder number
	Date of manufacture
	Single use only
	Indoor use only

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Symbols *(continued)*

	Alarm on
	Alarm off
	VF/VT alarm on
	VF/VT alarm silenced
>	Greater than
<	Less than
J	Joules
	Contrast
	Home screen button

(Continued on next page)

Symbols *(continued)*

	FASTPAK or LIFEPAK SLA battery in well 1, in use
	FASTPAK or LIFEPAK SLA battery in well 2, not in use
	FASTPAK or LIFEPAK SLA battery in well, discharged
	LIFEPAK NiCd battery in well, fully charged, not in use
	LIFEPAK NiCd battery in well, discharged
	Heart rate/pulse rate indicator
	Shock count (x) on screen
	Mark of conformity according to the European Medical Device Directive 93/42/EEC
	Canadian Standards Association certification for Canada and the United States

(Continued on next page)

Symbols *(continued)*

⎓	DC voltage
~	AC voltage
I	On (power: connection to the ac mains)
O	Off (power: disconnection from the ac mains)
⏻	Power on/off
→	[signal] Input
→	[signal] Output
♻ or ♻	Recycle this item
	Recycle NiCd battery
	Do not dispose of this product in the unsorted municipal waste stream. Dispose of this product according to local regulations. See http://recycling.medtronic.com for instructions on proper disposal of this product.

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Symbols *(continued)*

	Refer to instructions for disposal procedure
	AC to DC adapter
	System connector/Data in
	Telephone line connector
	Switch on
	Switch off
	Pace arrow, noninvasive pacing
	Pace arrow, internal pacing
	R-wave sense marker
	Event marker

(Continued on next page)

Symbols *(continued)*

	CO2 exhaust
	Chassis ground
	Recognized component mark for Canada and the United States
	LIFEPAK 12 to LIFEPAK 12 cable
!USA	For USA audiences only
	Bluetooth SIG, Inc. logo
MIN	Manufacturer's item number
CAT.	Catalog number used for placing orders

Device Description

This section describes how the LIFEPAK 12 defibrillator/monitor works. Topics include input signals, assembly functions, and device outputs. This section also provides a description of the physical characteristics and functionality of the LIFEPAK 12 defibrillator/monitor.

Introduction

About the Device

The LIFEPAK 12 defibrillator/monitor is a complete acute cardiac care response system with both manual and semiautomatic defibrillation operation. When clinically indicated, the LIFEPAK 12 defibrillator/monitor allows the operator to deliver a brief, high-energy pulse of electricity to a patient's heart. Operators may preconfigure the device to reduce complexity during normal operation. Built-in service features include self-calibration and testing.

Energy Waveforms

The LIFEPAK 12 Defibrillator/Monitor Series includes two distinct versions characterized by different defibrillator waveform technologies: monophasic and biphasic. The monophasic device generates a monophasic damped sinusoidal (MDS) shock pulse, while the biphasic device generates a biphasic truncated exponential (BTE) shock pulse for defibrillation.

Energy Delivery

The LIFEPAK 12 defibrillator/monitor standard method of energy delivery is through self-adhesive QUIK-COMBO pacing/defibrillation/ECG electrodes. When using these disposable electrodes (DDEs), internal circuitry continuously measures the impedance between the electrodes and allows defibrillation only when the defibrillation electrodes are attached to the patient. The user may select from a variety of optional accessories for energy delivery (for example, standard hard paddles or internal paddles).

(Continued on next page)

Introduction *(continued)*

Manual Mode Operation

In **manual mode** (ADVISORY indicator off), the device allows the operator to manually select an energy level, initiate a charge sequence, and apply energy in either direct or synchronized modes. When the operator selects the VF/VT ALARM from the ALARMS menu, the Continuous Patient Surveillance System (CPSS) monitors the patient's ECG for a shockable rhythm. A suspect rhythm alerts the operator with a priority tone and screen overlay. The operator can then follow locally established guidelines for administering defibrillation therapy.

Advisory Mode Operation

In the **advisory mode** (ADVISORY indicator on), the device uses the CPSS to monitor the patient's ECG for a shockable rhythm. A suspect rhythm alerts the operator with a priority tone and screen overlay. The operator may continue by pressing ANALYZE, which allows the Shock Advisory System (SAS) to analyze the ECG rhythm and make recommendations. The operator can then follow locally established guidelines for administering defibrillation therapy. For more information about CPSS and SAS, refer to the **operating instructions – Shock Advisory System**.

(Continued on next page)

Introduction *(continued)*

Device Primary Functions

The device has six primary functions:

- Defibrillation
  - Manual or semi-automatic (AED) defibrillation
  - Leads-off detection for therapy and ECG electrodes
  - Synchronized cardioversion
- Noninvasive Pacing
  - Demand and nondemand modes of operation
- Capture Patient Information
  - Stores both patient and device data at each event
  - Real-time clock provides time stamps for events
  - Provides operator review of stored events for printout or transmission
- Patient Signal Monitoring
  - ECG monitoring–displays up to three ECG waveforms at once
  - Pulse oximetry (SpO2) monitoring (continuous display)
  - Heart rate monitoring (continuous display)
  - Noninvasive blood pressure (NIBP) monitoring (continuous display)
  - Invasive pressure (IP) monitoring (continuous display)
  - Capnography (EtCO2 and RR) monitoring (continuous display)
  - Waveforms display pace and sense markers
  - Ventricular fibrillation/ventricular tachycardia monitoring and alarm

(Continued on next page)

Introduction *(continued)*

Device Primary Functions (continued)

- Capture and Analyze 12-lead ECG
  - Captures up to 45 minutes of continuous ECG data
  - Continuous printing of ECG data
  - Transmit ECG data to a remote site
  - Acquire and analyze 12-lead data
- Manage Alarms and Warnings
  - Places alarm limits on patient monitoring parameters
  - Automatic alarm limit reset at operator request
  - Activates or disables alarms and stores alarm events
  - Silence alarms for up to 15 minutes
  - Visual indicators and audible tones in alarm conditions

Service features include calibration and diagnostic functions.

(Continued on next page)

Introduction *(continued)*

Assemblies

The LIFEPAK 12 defibrillator/monitor consists of a two-piece case assembly that encloses the following printed circuit boards (when fully configured with options):

1. A01 System PCB
2. A02 Memory PCB
3. A03 Power PCB
4. A04 (Monophasic) / A04 (Biphasic) Therapy PCB
5. A05 Interface PCB
6. A06 OEM PCB
7. A07 Contact PCB
8. A08 Backlight PCB (LCD)
9. A16 (Nellcor) / A16 (Masimo) SpO2 Module
10. A21 NIBP Module
11. A22 Biphasic PCB (Biphasic)
12. A23 EtCO2 Module

... and the following subassemblies:

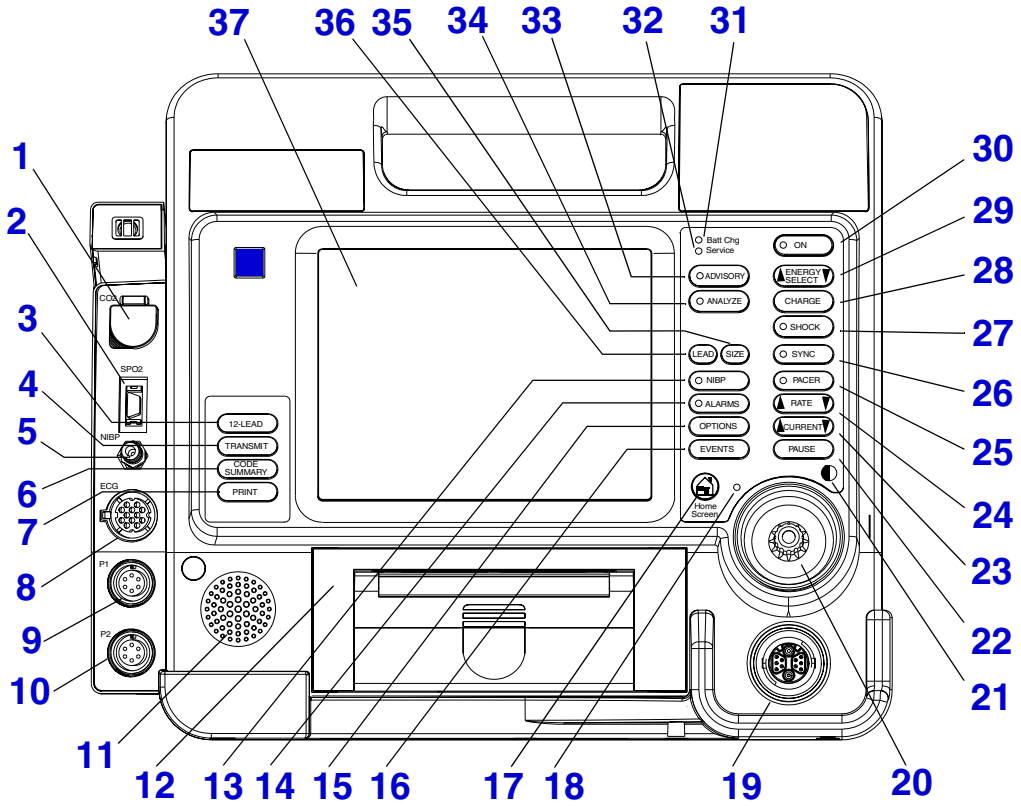
1. A09 Small Keypad
2. A10 Large Keypad
3. A11 (LCD) / A11 (EL) Display Assembly
4. A12 Printer Assembly
5. A13 Transfer Relay Assembly
6. A14 Waveshaping Inductor (Monophasic) / A14 Inductive Resistor (Biphasic)
7. A15 (Monophasic) / A15 (Biphasic) Energy Storage Capacitor

In addition, there are two battery wells, W10 Battery Pins (4x), W07 ECG Connector Cable, W08 System Connector Cable, W09 Auxiliary Connector Cable, W11 Therapy Connector Cable, W22 SpO2 Connector Cable, W15 Selector Assembly, W17 Speaker Assembly, C15 Pacing Capacitor, and associated labels, wiring, and hardware. See the **Interconnect Diagram—Monophasic** or **Interconnect Diagram—Biphasic**.

Physical Description and Features

Front Panel

For information about controls, indicators, or connectors, click the appropriate number from the following:



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Physical Description and Features *(continued)*

Front Panel (continued)

Number	Description
1	CO2 Connector (optional) — Intake port for the EtCO2 monitor. This is a device that continuously measures the amount of CO2 during each breath and reports the amount present at the end of exhalation (EtCO2).
2	SpO2 Connector (optional) — Connection point for the pulse oximeter. This is a noninvasive device that checks the saturation of oxygen in arterial blood. SpO2 is used for monitoring patients who are at risk of developing hypoxemia.
3	12-LEAD Control (optional) — Press to initiate the acquisition, analysis, storage, and printing of a 12-lead ECG report.
4	TRANSMIT Control — Press to transmit ECG episode records to another location through a direct, landline telephone or cellular telephone connection.
5	NIBP Connector (optional) — Port for connection to the blood pressure cuff. This measures the blood pressure of the adult or pediatric patient.

(Continued on next page)

Physical Description and Features *(continued)*

Front Panel (continued)

Number	Description
6	CODE SUMMARY Control — Press to print a summary of the current patient conditions, including patient name, critical event record, and ECG waveforms.
7	PRINT Control — Press to print a continuous ECG stripchart. Press again to stop printing.
8	ECG Connector — Connection point for the electrically isolated ECG patient cable. Cable configurations include the 12-lead main cable, with limb lead and precordial lead attachments, and the 3-lead cable.
9	P1 Connector (optional) — Connection point for the invasive pressure cables. This device invasively measures arterial blood pressures, central venous pressure (CVP), or intracranial pressure.
10	P2 Connector (optional)— Connection point for the invasive pressure cables. This device invasively measures arterial blood pressures, central venous pressure (CVP), or intracranial pressure.
11	Speaker — Provides audio voice prompts and alert tones.

(Continued on next page)

Physical Description and Features *(continued)*

Front Panel (continued)

Number	Description
12	Printer — Prints ECG waveforms, CODE SUMMARY Reports, and related topics. The 50 mm printer is standard and the 100 mm printer is optional, except for devices with the 12-lead ECG option, EtCO2 option, or Invasive Pressure where the 100 mm printer is standard.
13	NIBP Control (optional) — Press to initiate blood pressure measurement.
14	ALARMS Control and Indicator — Press to display the ALARMS overlay. The choices are: QUICK SET, LIMITS, SILENCE, and VF/VT ALARM. The indicator lights steady when setting alarms and flashes when an alarm condition exists.
15	OPTIONS Control — Press to display the OPTIONS overlay. The choices are: PATIENT for entering patient data, PACING to set demand or nondemand pacing, DATE/TIME, ALARM VOLUME, REPORTS for stored patient reports, PRINTER to set the printer frequency response, and a USER TEST.

(Continued on next page)

Physical Description and Features *(continued)*

Front Panel (continued)

Number	Description
16	EVENT Control — Press to display the EVENTS overlay. Your event choice is appended on the patient report, together with a date/time stamp.
17	Home Screen Control — Press to return to the home screen of the particular option or feature you are configuring. Pressing this control does not take you to a specific screen; instead, it returns to the home screen for the mode or event you are configuring.
18	Selector Indicator — Lights when the **SELECTOR** is active.

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Physical Description and Features *(continued)*

Front Panel (continued)

Number	Description
19	Therapy Connector — Connection point for the following: ■ QUIK-COMBO electrodes (standard) ■ FAST-PATCH electrodes (with optional cable) ■ Standard adult external paddles (optional) ■ Internal paddles with discharge control (optional) ■ External sterilizable paddles (optional) ■ Pediatric paddles (clip onto adult external paddles) ■ Posterior paddle (clips onto adult external APEX paddle) ■ Devices such as a test load or patient simulator
20	◉ Selector — When active, turn (either direction) to make choices from the menu or overlay shown on the screen. The Selector indicator lluminates your selection. Press to enter your choice.
21	◐ Screen Contrast Control (LCD only) — Press to adjust the display screen contrast. After pressing, rotate the Selector to select the desired contrast, then enter by pushing the Selector.

(Continued on next page)

Physical Description and Features *(continued)*

Front Panel (continued)

Number	Description
22	PAUSE Control (optional) — Press and hold the PAUSE button. This causes the pacer to pace at 25% of the set rate. While the PAUSE button is pressed, “Paused” appears before PPM at the bottom of the screen. Release to resume pacing at the set rate.
23	▼CURRENT▲ Control (optional) — Press to display the PACING overlay. Press the up-arrow or down-arrow portion of the control to adjust pacing current in 10 mA increments, or rotate the Selector to change the current in 5 mA increments.
24	▼ RATE ▲ Control (optional) — Press to display the PACING overlay. Press the up-arrow or down-arrow portion of the control to adjust pacing rate in 10 ppm (pulses per minute) increments, or rotate the Selector to change the rate in 5 ppm increments.

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Physical Description and Features *(continued)*

Front Panel (continued)

Number	Description
25	○ PACER Control and Indicator (optional) — Press to activate pacing and light the indicator. You must be in manual mode and have QUIK-COMBO leads attached or the indicator will not light. Pressing this control trips the device out of the defibrillation mode, terminates synchronized cardioversion, and dumps any energy stored on the defibrillation capacitor.
26	○ SYNC Control and Indicator — Press to activate synchronized cardioversion. The indicator illuminates. You must be in manual mode to use SYNC. When synchronized, the indicator flashes with each detected QRS complex. To deactivate SYNC, press a second time.
27	○ SHOCK Control and Indicator — Press to deliver energy in either advisory mode or manual mode. The indicator flashes when the device is fully charged. You use shock buttons on the hard paddles to deliver energy.

(Continued on next page)

Physical Description and Features *(continued)*

Front Panel (continued)

Number	Description
28	CHARGE Control — Press to start a charge sequence. You must be in manual mode and have QUIK-COMBO leads or hard paddles attached. When operating with hard paddles, use the CHARGE button on the paddles. If the device is in pacing mode, pressing this control changes the device mode from pacing to manual.
29	▼ ENERGY SELECT ▲ Control — Press to select an energy level. You must be in manual mode to use this control. There are multiple selectable energy levels between 2 joules and 360 joules with internal paddles limited to 50 joules maximum.
30	○ ON Control and Indicator — Press to turn the LIFEPAK 12 defibrillator/monitor on and off. The indicator is illuminated when the device is turned on.
31	○ Batt Chg Indicator — Illuminates when the device is powered by an ac power adapter or dc power adapter and at least one battery is installed in the device and charging.

(Continued on next page)

Physical Description and Features *(continued)*

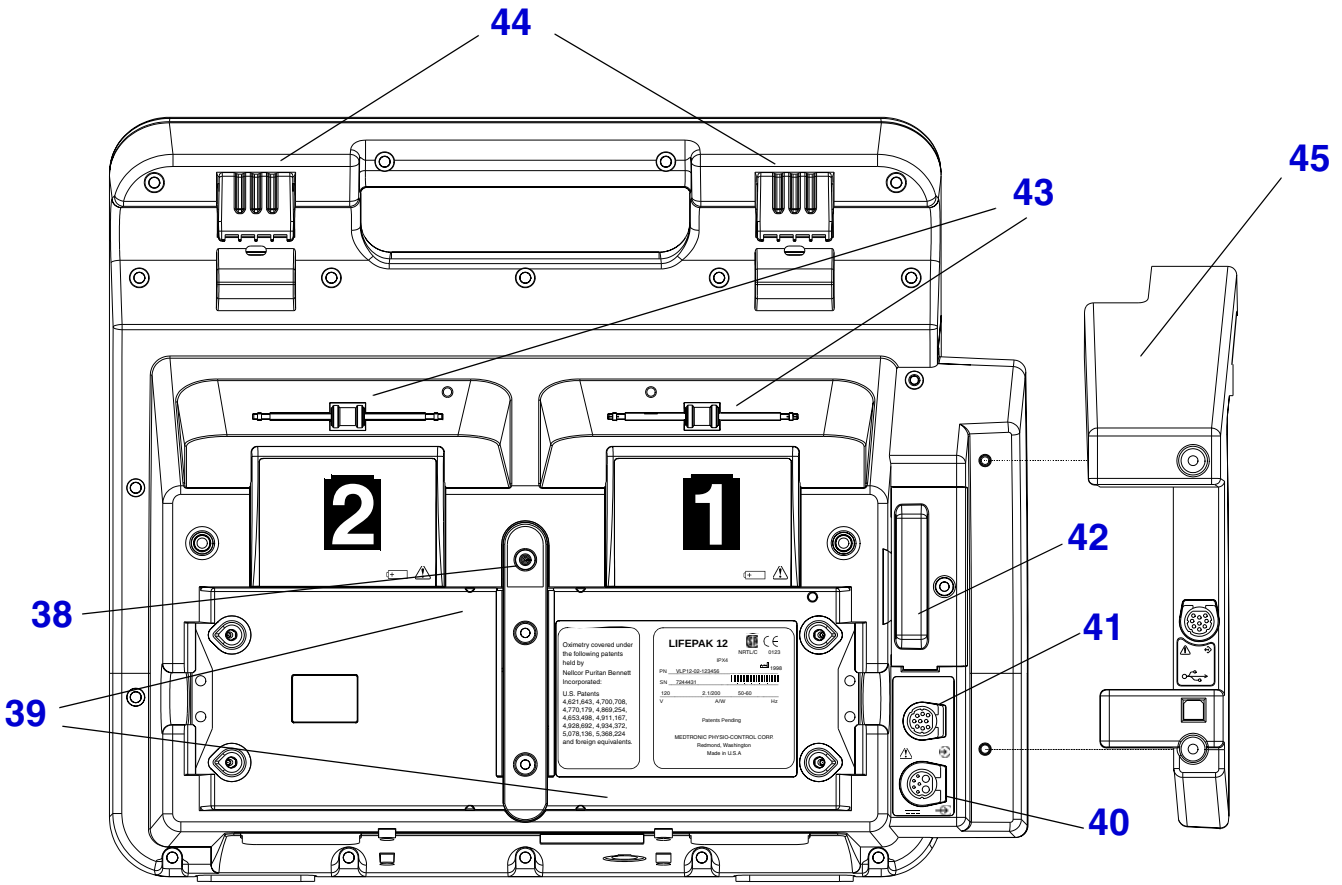
Front Panel (continued)

32	○ Service Indicator — Illuminates when service error codes are written into the error log (accessed through the **service mode**). Refer to **Troubleshooting** for information about error codes.
33	○ ADVISORY Control and Indicator (optional) — Press to switch between manual mode (indicator off) and advisory mode (indicator on). In advisory mode, the Continuous Patient Surveillance System (CPSS) monitors the patient's ECG for a potentially shockable rhythm.
34	○ ANALYZE Control and Indicator (optional) — Press to activate the Shock Advisory System (SAS) in advisory mode, which analyzes the patient's ECG for a potentially shockable rhythm. The indicator lights when SAS is active.
35	LEAD Control — Press to select ECG lead for lead set.
36	SIZE Control — Press to select ECG lead size.
37	Display Screen — The electroluminescent (EL) or liquid crystal display (LCD) screen displays operating messages, waveforms, status messages, setup screens, and the like.

(Continued on next page)

Physical Description and Features *(continued)*

Back Panel



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Physical Description and Features *(continued)*

Back Panel (continued)

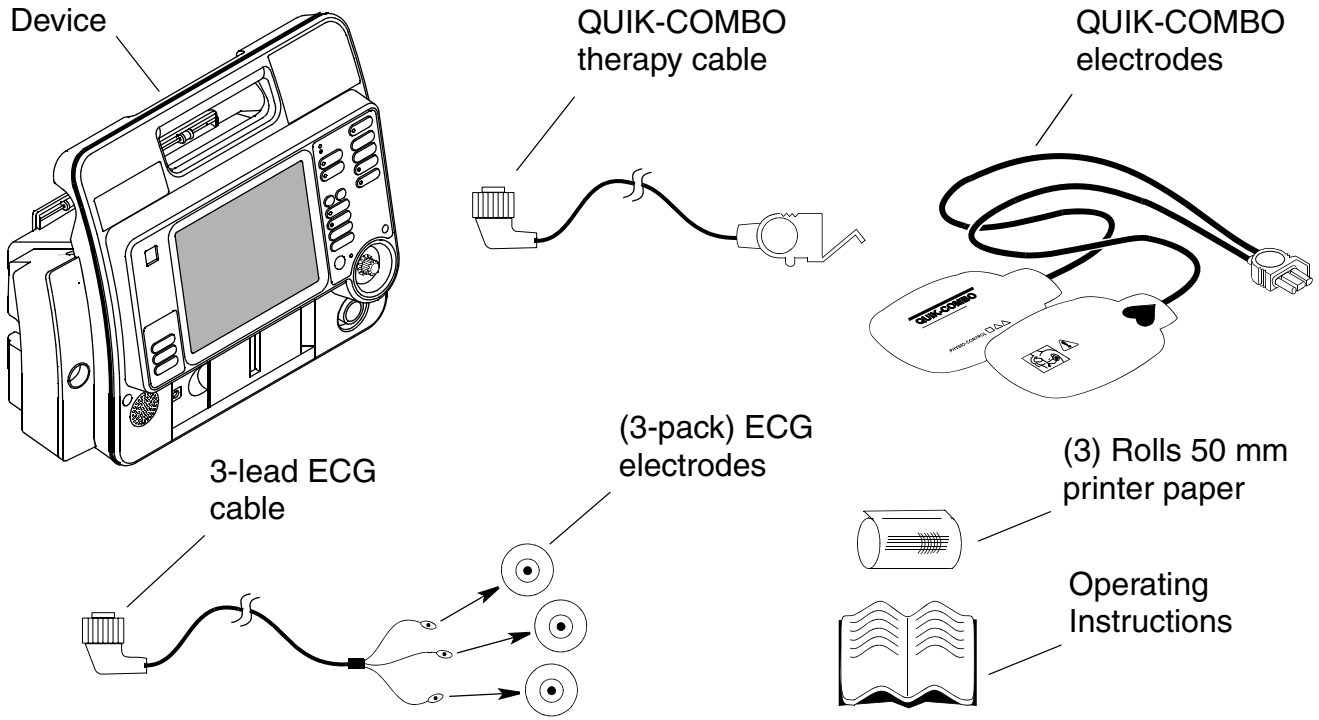
Number	Description
38	CO2 Exhaust Port (optional) — Vents gasses from CO2 monitor.
39	Battery Compartments — Accommodate two removable battery paks that provide power for the LIFEPAK 12 defibrillator/monitor.
40	Auxiliary Connector — Connection point for an ac power adapter or dc power adapter.
41	System Connector — Connection point for a modem or computer for transmitting patient reports and for an ECG analog output. You can also connect to another LIFEPAK 12 defibrillator/monitor for transferring setup options.
42	PC Card Slot — Accepts modem or Bluetooth cards.
43	Standard Paddle Wells — Storage area for a set of standard paddles.
44	Gurney Hooks — Used to mount the defibrillator monitor from a gurney rail.
45	Voice Recorder Accessory (optional) — Stores up to 90 minutes of voice recording to be merged later with a patient record using CODE-STATE Suite.

(Continued on next page)

Physical Description and Features *(continued)*

What Is Shipped with a Basic Device

A basic device includes the components shown below. For additional information about components, refer to Accessories, Supplies, and Training Tools in the **LIFEPAK 12 Defibrillator/Monitor Series Operating Instructions – Maintaining the Equipment**.



Devices, Options, Supplies, and Accessories

The following table, provided for reference, summarizes optional configurations, supplies, and accessories that are available. For MINs (part numbers) and up-to-date ordering information, refer to the latest operating instructions.

Item	Description	Reference
LIFEPAK12 Defibrillator/Monitor		
Basic Device	Device with 50 mm Printer. Includes: ■ 3-lead ECG cable ■ 3-pack LIFE•PATCH® ECG electrodes ■ QUIK-COMBO therapy cable ■ Two sets QUIK-COMBO electrodes ■ Therapy Electrode operating instructions ■ Device operating instructions ■ 3 rolls of 50 mm printer paper ■ Therapy Connector Protective Guard	
Language		
	English French German Spanish Swedish Italian Finnish Dutch Polish Portuguese Danish Norwegian Korean Japanese Mandarin - Chinese	Specify language

(Continued on next page)

Ordering Devices, Supplies, and Accessories *(continued)*

Item	Description
Optional Features	
Pacing	Upgradable in the field Accessories: ■ QUIK-COMBO Therapy Cable
SpO2 (Nellcor or Masimo)	Upgradable in the field Accessories: ■ Nellcor or Masimo SpO2 Sensors ■ SpO2 Sensor Extender Cable
EtCO2	Upgradable in the field Accessories: ■ Airway Adapter ■ FilterLine ■ Nasal FilterLine
NIBP	Upgradable in the field Accessories: ■ Reusable blood pressure cuff ■ Disposable blood pressure cuff

(Continued on next page)

Ordering Devices, Supplies, and Accessories *(continued)*

Item	Description
Optional Features	
Vital Signs and ST Segment Trending	Upgradable in the field Provides graphical plot trending of vital signs or ST segment for up to 8 hours.
Voice Recording	Upgradable in the field, includes: ■ Voice recorder accessory ■ PC download software. Provides up to 90 minutes of voice recording.
LIFENET® BLUE (Bluetooth) wireless data transfer	Upgradable in the field, includes: ■ Bluetooth PC card ■ Reference guide

(Continued on next page)

Ordering Devices, Supplies, and Accessories *(continued)*

Item	Description
Optional Features	
IP	Upgradable in the field Accessories: Refer to operating instructions for IP accessories.
12-Lead ECG	Upgradable in the field. Includes: ■ Main trunk cable ■ 4-wire limb lead attachment ■ 5-wire precordial lead attachment ■ Two 3-pack LIFE•PATCH ECG electrodes ■ One 4-pack LIFE•PATCH ECG electrodes ■ 12-Lead quick reference card ■ 100 mm printer instead of 50 mm printer ■ Two rolls of 100 mm printer paper
Electroluminescent (EL) Display	Upgradable in the field High-Visibility display option, best used in indoor applications.
100 mm Printer upgrade	Upgradable in the field Adds multichannel recording capability.

(Continued on next page)

Ordering Devices, Supplies, and Accessories *(continued)*

Item	Description
Optional Therapy Delivery	
FAST-PATCH therapy cable	Optional
Standard Paddles (can be purchased instead of QUIK-COMBO cable and electrodes)	Pair
Pediatric Paddle Adapter (attach to standard paddles)	Two required
Posterior Paddle Adapter (attach to standard paddles)	Each
External Sterilizable Paddles (attach to standard paddles)	Pair
Invasive Pressure	Invasive pressure cable Invasive pressure transducer Refer to operating instructions.

(Continued on next page)

Ordering Devices, Supplies, and Accessories *(continued)*

Item	Description
Electrodes	
QUIK-COMBO EDGE System Multifunctional Electrodes	■ Standard — one pair ■ REDI-PAK™ preconnect system — one pair ■ Radio Transparent System (RTS) — one pair ■ RTS, Pediatric — one pair ■ Long Lead Wire Electrodes — one pair
FAST-PATCH PLUS pacing/ defibrillation/ECG Electrodes	One pair
LIFE•PATCH ECG Electrodes (for monitoring only)	Sets of 3 or 4
Internal Paddle Handles and Cable	One pair (with discharge control)

(Continued on next page)

Ordering Devices, Supplies, and Accessories *(continued)*

Item	Description
Power Options	
Batteries (two per device)	■ FASTPAK NiCd ■ FASTPAK 2 NiCd (with fuel gauge) ■ LIFEPAK NiCd (with fuel gauge) ■ LIFEPAK SLA
Battery Support Systems	■ Battery Support System 2 — includes power cord and operating instructions ■ Mobile Battery Service Station — includes power cord and operating instructions (Required for conditioning FASTPAK, FASTPAK 2, LIFEPAK NiCd and LIFEPAK SLA batteries) ■ Battery Support Wall Mount Bracket — Battery Support System 2 or Mobile Battery Service Station (optional)
Power Adapter	■ AC Power Adapter — includes power cord and built-in output cable (Power Adapter will not condition batteries) ■ Extension dc output cable

Ordering Devices, Supplies, and Accessories *(continued)*

Item	Description
Data Management and Communications	
LIFENET BLUE	■ Bluetooth Internal PC Card (Reference Guide included)
Modems	■ Internal PC Card modem, 55.6k (PC Card and cable) ■ Modem door assembly (required for Internal PC card modem) ■ External modem (requires an External modem adapter cable) ■ External modem adapter cable — 6 feet ■ External modem adapter cable — 10 feet
Cables	■ Device-to-PC serial port interface cable (connect to a serial port on a PC or other equipment) ■ Device-to-device (used to transfer a setup configuration between devices) ■ Analog ECG output cable (used to monitor ECG waveforms on external equipment)

(Continued on next page)

Ordering Devices, Supplies, and Accessories *(continued)*

Item	Description
Data Management and Communications (continued)	
PC Software	■ CODE-STAT Suite data management system for PCs
Training Tools	
FAST-PATCH	■ Patient Simulator — with FAST-PATCH posts (used with FAST-PATCH therapy cable) ■ FAST-PATCH training electrodes — one pair (used with FAST-PATCH therapy cable) ■ FAST-PATCH training electrode cable
QUIK-COMBO	■ Patient Simulator, QUIK-COMBO, 3-Lead ■ Patient Simulator, QUIK-COMBO, 12-Lead (used with 12-Lead ECG feature) ■ QUIK-COMBO training electrodes - one pair ■ QUIK-COMBO training electrode cable ■ QUIK-COMBO test post adapter (use with Patient Simulator with FAST-PATCH Posts)
Testers	■ Defibrillation checker ■ Test load — for use with QUIK-COMBO therapy cable only

(Continued on next page)

Ordering Devices, Supplies, and Accessories *(continued)*

Item	Description
Technical Manuals	
Operating Instructions	■ Printed, one included per device, no charge
Service Manual	■ CD-ROM, one included per order, no charge (printed version optional)
Carrying Bags	■ Basic Carrying Bag System — device only (includes shoulder strap, left and right bags) ■ Top pouch (cannot be used with standard paddles) ■ Rear Bag — (screws into back of device) ■ Front cover

(Continued on next page)

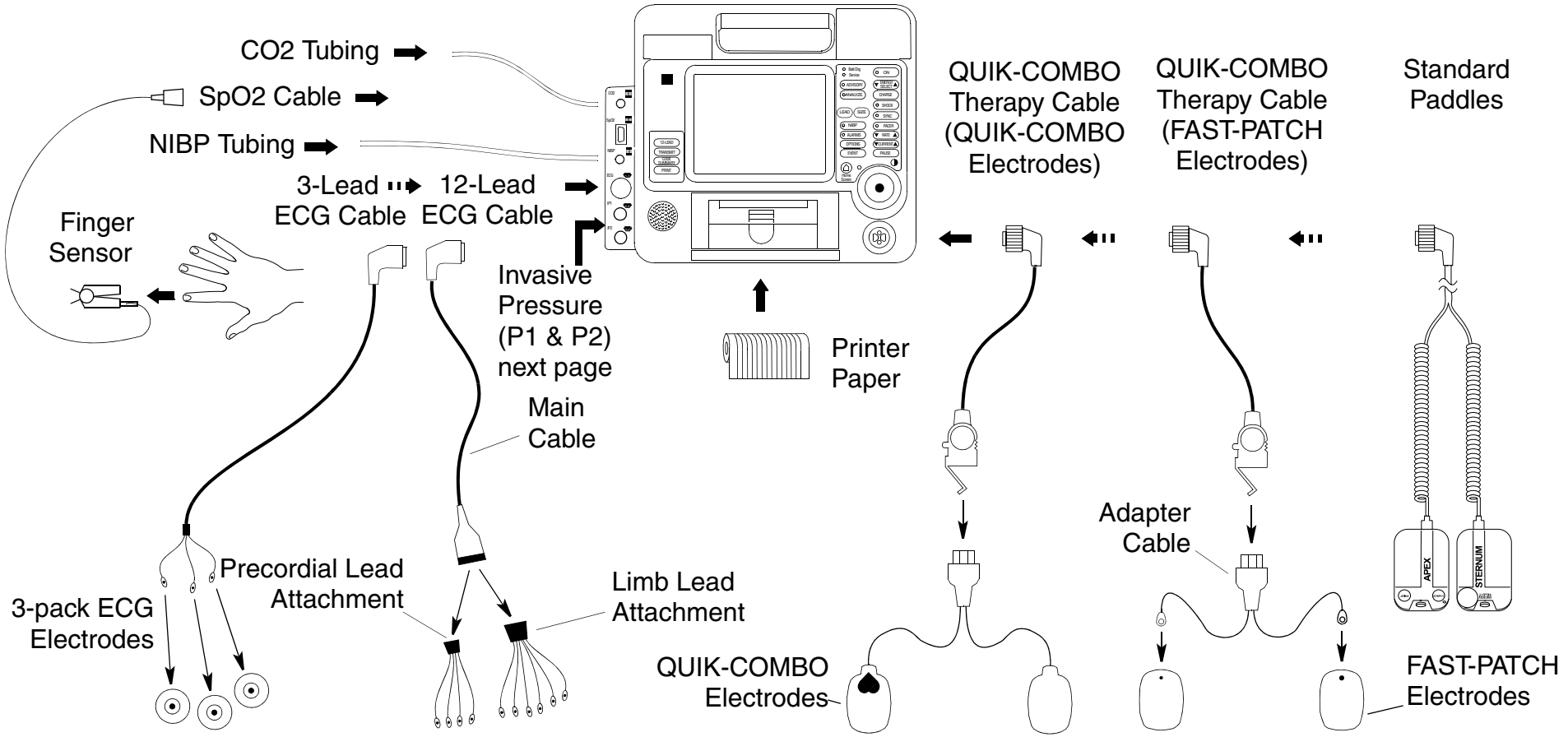
Ordering Devices, Supplies, and Accessories *(continued)*

Item	Description
Supplies	
Printer Paper	■ 50 mm printer paper — box of 3 rolls (for products with 50 mm printer) ■ 100 mm printer paper — box of 2 rolls (for products with 100 mm printer)
DERMA-JEL electrode jell	■ Use with hard paddles

System Context Diagram

Front of Device

The system context diagram shows you how the device connects with external equipment, including accessories, batteries, and auxiliary power devices.

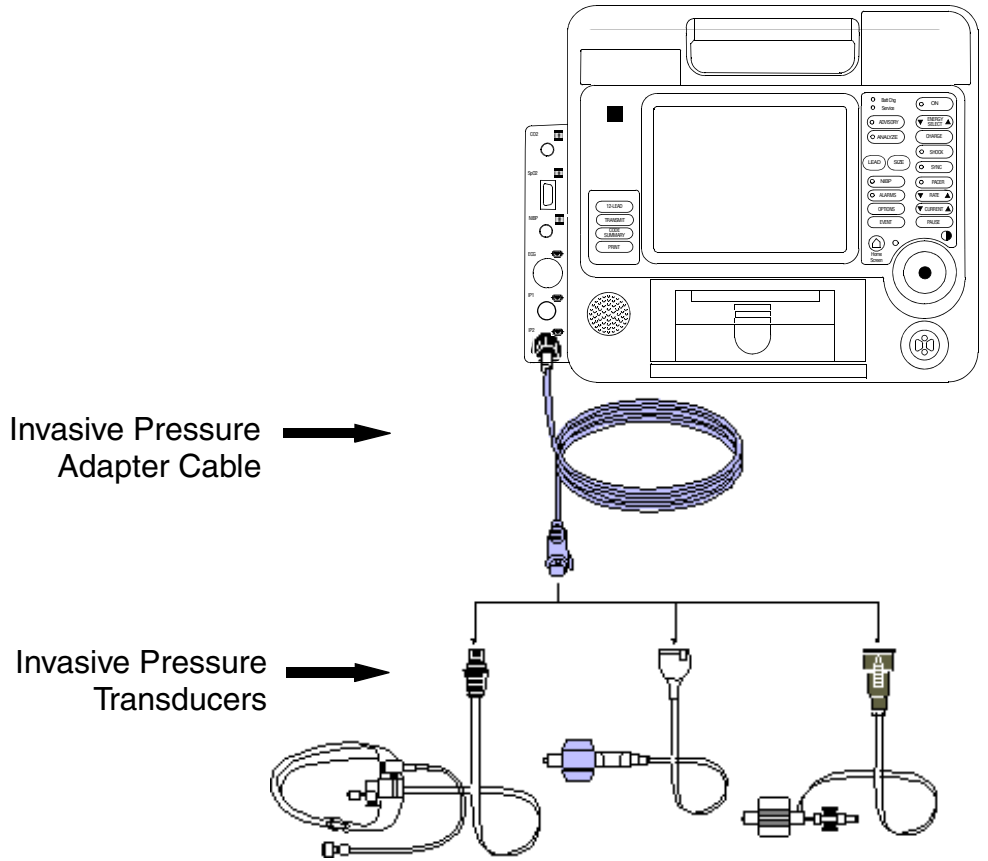


System Context Diagram *(continued)*

Front of Device (continued)

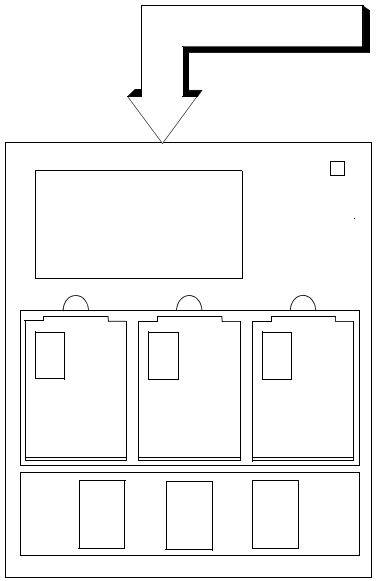
Refer to the **LIFEPAK 12 Defibrillator/Monitor Series Operating Instructions – Maintaining the Equipment** for a complete list of invasive pressure accessories.

The system context diagram shows you how the device connects with invasive pressure devices.

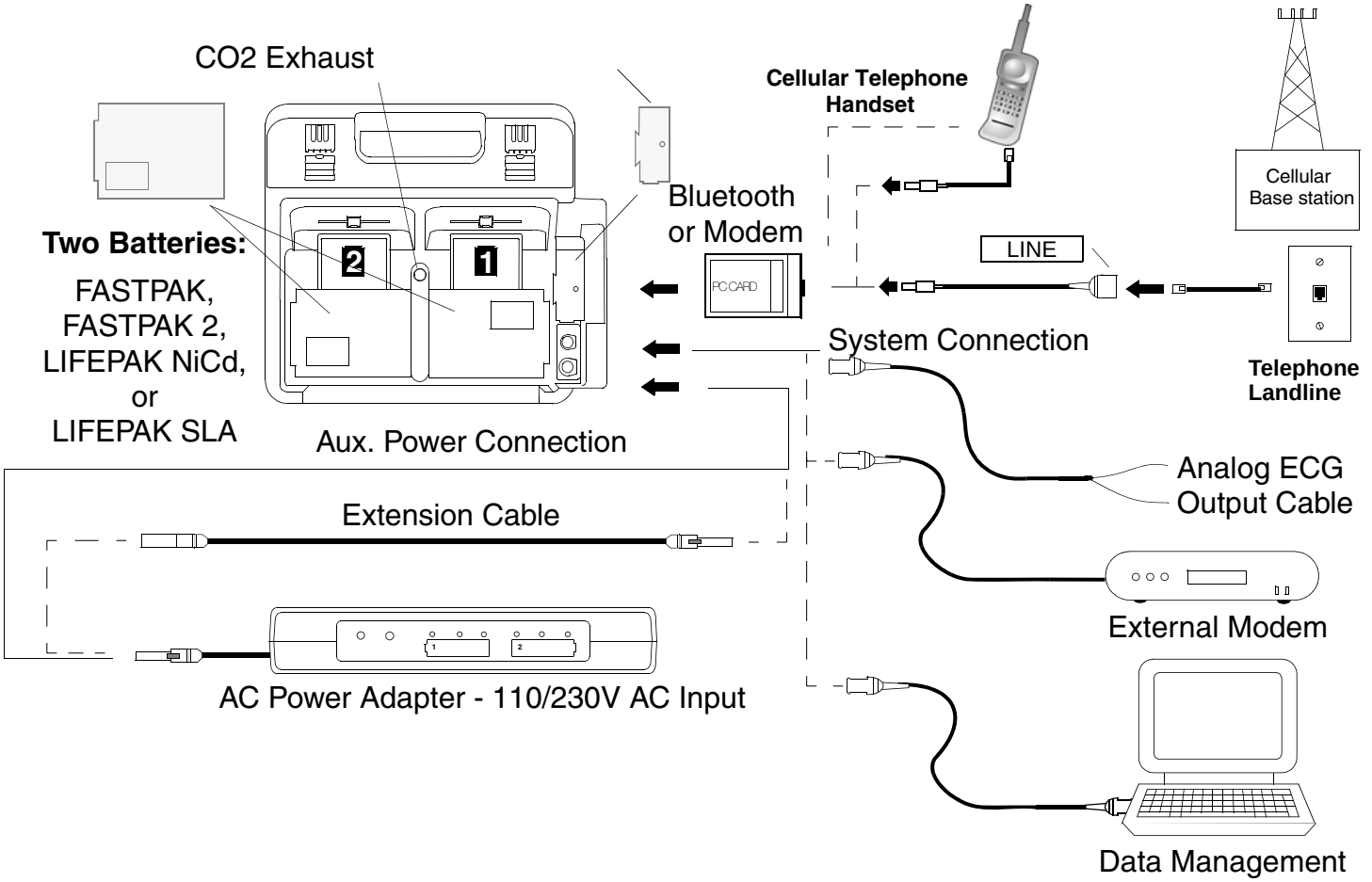


System Context Diagram *(continued)*

Back of Device



Battery Support System 2 or Mobile Battery Service Station
FASTPAK batteries
FASTPAK 2 batteries
LIFEPAK NiCd batteries
LIFEPAK SLA batteries



Functional Description

The LIFEPAK 12 defibrillator/monitor series is a platform medical device capable of combining a variety of therapeutic and monitoring features. In addition to manual defibrillation, semiautomatic defibrillation, and noninvasive pacing, the LIFEPAK 12 defibrillator/monitor offers optional oximetry, invasive pressure, noninvasive blood pressure, CO2, and 12-lead ECG monitoring. A key feature of the LIFEPAK 12 defibrillator/monitor is its ability to be upgraded as the needs of the customer change or as new monitoring modes become available. This portable device may be powered from any of three battery types or optional ac power adapter.

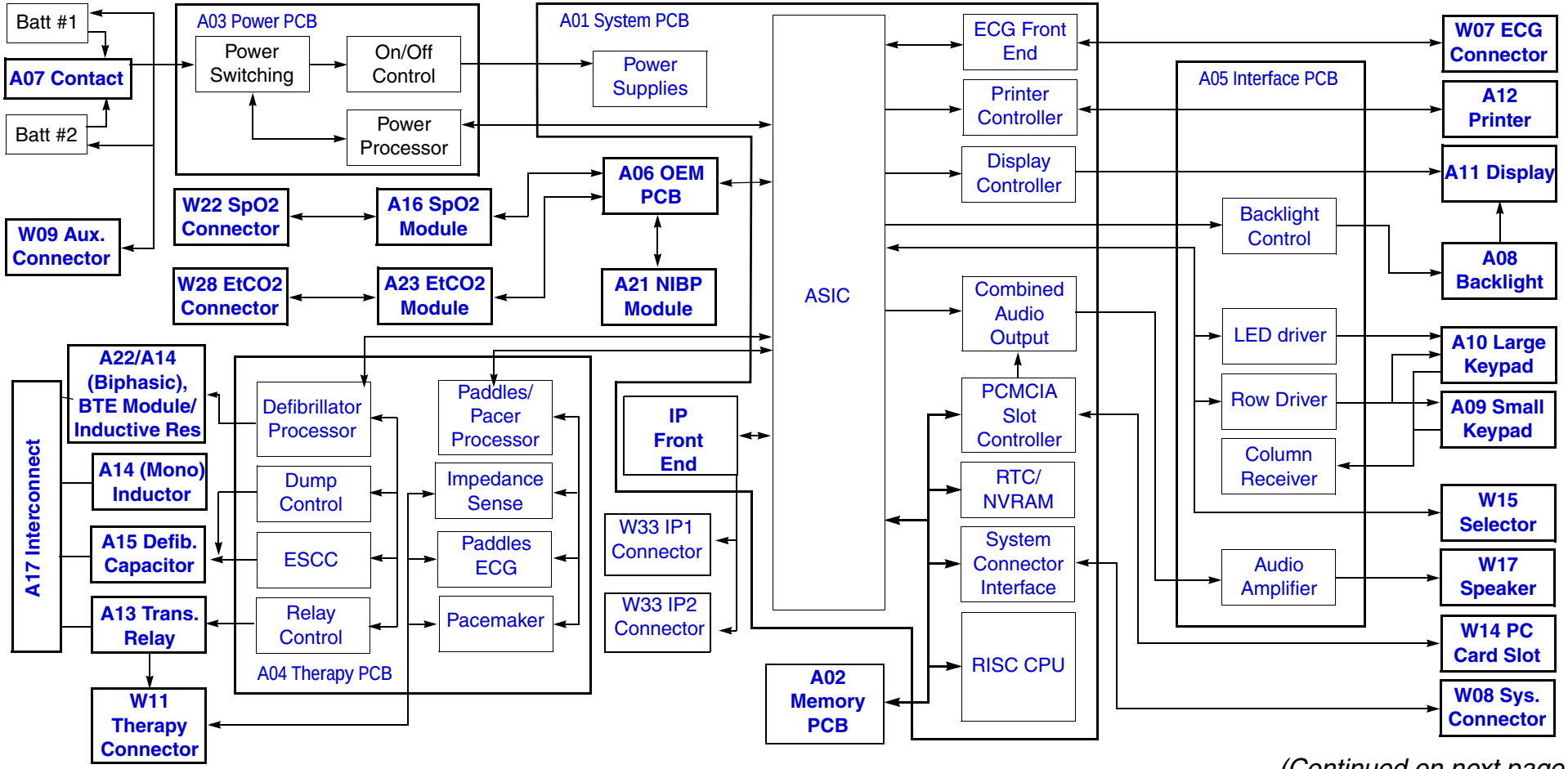
The following functional description is intended to provide service personnel with a basic understanding of the LIFEPAK 12 defibrillator/monitor design. Its purpose is to assist the qualified service technician in troubleshooting to the subassembly level. Troubleshooting below the subassembly level outside the factory is not recommended, nor is it within the scope of this service manual to provide the detail necessary to support such repairs.

Refer to the LIFEPAK 12 defibrillator/monitor **System Block Diagram** when necessary as you review the following description.

(Continued on next page)

Functional Description *(continued)*

This System Block Diagram is linked to the corresponding descriptive text.



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Functional Description *(continued)*

A01 System PCB

The A01 System PCB integrates and controls all functions of the LIFEPAK 12 defibrillator/monitor. There are two primary components: A 32-bit **Reduced Instruction Set Computer (RISC processor)**, which functions as the central processing unit (CPU) for intensive number-processing tasks, and an **Application-Specific Integrated Circuit (ASIC)**, which operates as the interface between the CPU and all other device therapeutic, monitoring, data management, and display subsystems.

The following discussion identifies major subsystems of the A01 System PCB and their basic functions.

- **Power Supplies** — The A01 System PCB uses SW_VB (Switched Battery Voltage) from the A03 Power PCB (via the A04 Therapy PCB) to originate four power supplies for use throughout the device as follows:
  - +5 V logic power for use on the A01 System PCB within the PCMCIA, DUART, RTC, ASIC, and audio subsystems and the A04 Therapy PCB.
  - +3.3 V logic power for use on the A01 System PCB within the RISC CPU, DSP, main memory, and ASIC subsystems.
  - ±12 V analog power for use on the A01 System PCB, A04 Therapy PCB, and for A11 LCD Assembly contrast.
  - +24 V power for use in the A01 System PCB Printer subsystem.

(Continued on next page)

Functional Description *(continued)*

A01 System PCB (continued)

- **ECG Front End** — The LIFEPAK 12 defibrillator/monitor simultaneously captures inputs from up to 10 independent patient connected leads for use in the interpretive 12-lead algorithm and basic ECG waveform display. The ECG front end performs the functions of patient isolation, electrostatic discharge and defibrillation protection, lead selection, baseline dc restore, bandwidth filtering, internal pacemaker detection, and ECG sampling via analog-to-digital conversion (ADC). Results from the ADC process pass across the isolation barrier to the A01 System PCB Digital Signal Processor (DSP) for filtering and signal conditioning before use by the RISC CPU. ECG input is through the parameter bezel W07 ECG connector cable.
- **IP Front End** — The invasive pressure (IP) circuitry processes the input signal from a disposable IP transducer through the IP input connectors on the LIFEPAK 12 defibrillator/monitor parameter bezel. Two input connectors are provided for simultaneous monitoring of two IP channels. The W33 invasive pressure harness provides the connection from the parameter bezel to the A01 System PCB assembly, where the IP preamplifier circuitry is located.

(Continued on next page)

Functional Description *(continued)*

A01 System PCB (continued)

The IP preamplifier is isolated from the ac power ground by the ECG preamplifier iso-barrier. The transducer drive circuitry supplies a positive 2.5 V and a negative 2.5 V excitation voltage to the resistive bridge-type transducer. The output signal from the transducer is conditioned by a low-pass filter at the input of an instrumentation amplifier, which amplifies the signal approximately 400 times. The signal is then multiplexed to the A-D converter, digitized, and then sent serially across the iso-barrier for DSP processing and display.

- **Printer Controller** — The LIFEPAK 12 defibrillator/monitor uses either a 50 millimeter (mm) or 100 mm thermal array printer. In either case, the A01 System PCB printer controller governs motor speed, adjusts print strobe pulse width, senses paper presence and door closure, senses printhead temperature, and provides the data to be printed. Printer fonts are stored in memory devices located on the A01 System PCB.
- **PCMCIA Slot Controller** — The LIFEPAK 12 defibrillator/monitor uses a (PCMCIA) modem or Bluetooth PC card for data transmission to external data management programs. All internal data exchange between the PC card and the device is handled by the A01 System PCB PCMCIA controller.

(Continued on next page)

Functional Description *(continued)*

A01 System PCB (continued)

- **Real-Time Clock/Non-Volatile RAM (RTC/NVRAM)** — The RTC/NVRAM maintains the date and time, and provides storage for instrument user setups, device manufacturing configuration (a Medtronic proprietary file), and calibration data. The RTC/NVRAM is powered by a lithium coin cell battery.
- **System Connector Interface** — The LIFEPAK 12 defibrillator/monitor may be connected to external devices for transmitting analog ECG signal output, data transmission, factory test, Medtronic field service data collection, and device configuration during field upgrade. Except for analog ECG signals, all data communications at the system connector are at RS-232 levels.

  The analog ECG signal output path consists of A01 System PCB components including a digital-to-analog converter (DAC), low-pass filter, and electrostatic discharge protection.

  The digital communications output path consists of two components: a dual universal asynchronous receiver/transmitter (DUART); and a level-shifter used for converting device internal logic levels to RS-232 levels.

(Continued on next page)

Functional Description *(continued)*

A01 System PCB (continued)

- **Display Controller** — Data for display on the device A11 Display Assembly originates from the A01 System PCB Display Controller made up of a portion of the ASIC and dedicated data driver/buffers. Display controller hardware includes video RAM and LCD contrast control. Screen fonts are stored in memory devices located on the A01 System PCB.
- **Combined Audio Output** — Originates from either the A01 System PCB ASIC or a PCMCIA card installed in the card slot. System audio (voice prompts and alarm tones) from the ASIC returns to analog form in an A01 System PCB DAC. System audio combined with PCMCIA card audio is filtered and routed to the A05 Interface PCB **Audio Amplifier** for application to the W17 Speaker Assembly. Voice prompts are stored in memory devices located on the A01 System PCB.

A02 Memory PCB

LIFEPAK 12 defibrillator/monitor main operating system software and patient data management files are stored in flash (EEPROM) memory devices located on the A02 Memory PCB.

(Continued on next page)

Functional Description *(continued)*

A03 Power PCB

The A03 Power PCB manages application of power to the LIFEPAK 12 defibrillator/monitor from available sources (either of the two batteries or an attached power adapter). Additional functions include power on/off control, “smart” battery communication, routing battery charge currents, battery voltage measurement, over-current protection fusing, and serial communication of power status to the A01 System PCB.

A03 Power PCB operation centers around a power processor, which detects the presence of available power sources, selects a power source for use by the device, monitors their status (for example, low battery, replace battery, removal from the device, and so forth), and applies charging currents from an attached power adapter to the batteries.

When the LIFEPAK 12 defibrillator/monitor is off, closure of the device power control activates A03 Power PCB circuitry to alert the power processor, which chooses the appropriate source to originate SW_VB (switched battery voltage) power. SW_VB is then routed, in turn, to the A04 Therapy PCB and A01 System PCB for use, as is, and for further processing into system power supply voltages.

Closure of the power control when the LIFEPAK 12 defibrillator/monitor is on triggers an orderly device shutdown prior to turning off SW_VB.

(Continued on next page)

Functional Description *(continued)*

A04 Therapy PCB

The A04 Therapy PCB maintains the patient interface for therapeutic purposes. In addition to developing defibrillation and noninvasive pacing energies, the A04 Therapy PCB ensures safe delivery of those energies, captures PADDLES ECG, and monitors attachment of the QUIK-COMBO electrodes.

The following discussion identifies major subsystems of the A04 Therapy PCB and their basic functions.

- **Defibrillator Processor** — The defibrillator processor manages the defibrillator energy storage and delivery functions using serial inputs from the A01 System PCB ASIC, hardware inputs from external paddles, and inputs from other A04 Therapy PCB circuitry. Status of the defibrillator subsystem is reported serially to the A01 System PCB ASIC.
- **Energy Storage Capacitor Charger (ESCC)** — Under control of the defibrillator processor, the ESCC converts COM_VB (common battery voltage) to high voltage for application to the energy storage capacitor. Circuitry within the ESCC performs comparisons between stored energy and target energy to limit charging to the value selected by the user. Additional circuits compensate the ESCC for low battery voltage, provide over-voltage protection, and send divided capacitor high voltages to separate safety monitoring and energy display circuits.

(Continued on next page)

Functional Description *(continued)*

A04 Therapy PCB (continued)

- **Transfer Relay Control** — To enable the transfer of defibrillation energy, the A04 Therapy PCB integrates control signals from the SHOCK control (or external paddles discharge controls), defibrillator processor, ESCC, and the A01 System PCB ASIC. The transfer relay will be activated only to deliver energy to the defibrillation electrodes when all conditions are satisfied in each system component.
- **Dump Relay Control** — A fail-safe system used to safely dissipate defibrillation energies from the energy storage capacitor under a number of circumstances, for example, change of energy selection, when power is removed, pacing is activated, QUIK-COMBO leads off, and the like. With the exception of power removal, the dump relay control system functions under the control of the system and/or defibrillator processors.
- **QUIK-COMBO Leads Off (Impedance Sense/Motion Detection)** — The LIFEPAK 12 defibrillator/monitor activates leads off/motion detection when using QUIK-COMBO electrodes. For purposes of this discussion, consider the leads off/motion detector and patient system as a simple voltage divider.

(Continued on next page)

Functional Description *(continued)*

A04 Therapy PCB (continued)

Leads off/motion detection relies on two key characteristics: leads off/motion detector output impedance is relatively high (greater than 125 kΩ), and patient impedance is relatively low (typically less than 300 Ω). To exploit these characteristics, the device injects an ac impedance drive signal through the QUIK-COMBO electrodes into the relatively low patient impedance and monitors the voltage drop across the patient. Minute perturbations sensed in the low-amplitude signal developed across the patient represent motion; gross changes in the sensed signal indicate electrode disconnection.

- **Paddles/QUIK-COMBO ECG Preamplifier** — The ECG Paddles/ QUIK-COMBO ECG Preamplifier performs the functions of patient isolation, electrostatic discharge and defibrillation protection, baseline dc restore, bandwidth filtering, internal pacemaker detection, and ECG sampling through analog-to-digital conversion (ADC). Results from the ADC process are fed to the **Paddles/Pacer Processor**.

(Continued on next page)

Functional Description *(continued)*

A04 Therapy PCB (continued)

- **Paddles/Pacer Processor** — The paddles/pacer processor controls all facets of noninvasive pacemaker operation and paddles ECG signal acquisition. Inputs received serially from the A01 System PCB ASIC are translated into controls to enable noninvasive pacemaker delivery of properly timed pacing impulses at the desired current. Analog ECG from the Paddles/QUIK-COMBO ECG Preamplifier is processed for local use and for transfer across the isolation barrier to the A01 System PCB DSP and onto the A01 System PCB ASIC.
- **Noninvasive Pacemaker** — The A04 Therapy PCB Noninvasive Pacemaker subsystem develops isolated, adjustable current, 20 millisecond (nominal), trapezoidal transchest pacing impulses. Major components of the noninvasive pacemaker include the paddles/pacer processor, isolated low- and high-voltage power supplies, safety monitors, output current, pulse width, and pulse shape controls. Controls for, and status of, the noninvasive pacemaker pass serially between the paddles/pacer processor and the A01 System PCB ASIC.

(Continued on next page)

Functional Description *(continued)*

A05 Interface PCB

The A05 Interface PCB is primarily a signal collector/distributor used to simplify the routing of cables between the front and rear halves of the LIFEPAK 12 defibrillator/monitor. The majority of signals from the device rear half are consolidated into the W04 System PCB/Interface PCB Cable and passed to the A05 Interface PCB for further distribution to front half components, example, A09 Small Keypad, A10 Large Keypad, A11 Display Assembly, and A12 Printer Assembly. The following active circuits reside on the A05 Interface PCB:

- **Audio Amplifier — Combined Audio Output** signals receive final amplification in the A05 Interface PCB Audio Amplifier prior to application to the W17 Speaker Assembly.
- **LED Driver** — Most device LEDs (located on the A10 Large Keypad) receive their drive from a serial-to-parallel converter located on the A05 Interface PCB. The SERVICE LED drive originates from the A01 System PCB ASIC. The CHARGE and POWER LEDs receive their drive from the A03 Power PCB Power Processor.

(Continued on next page)

Functional Description *(continued)*

A05 Interface PCB (continued)

- **Keypad Row Driver** — The A01 System PCB ASIC reads device control keys using a row and column address scheme, that is, each key resides at a unique row and column address. Data from the ASIC shifts serially into the A05 Interface PCB Keypad Row Driver (a serial-to-parallel converter) for application to key rows in the A09 Small Keypad and A10 Large Keypad. A key closure enables row drive for a unique key to be sensed at the **keypad column receiver**.
- **Keypad Column Receiver** — The A01 System PCB ASIC reads key closures serially from the interface keypad column receiver (a parallel-to-serial converter). In practice, closure of a device key passes **row drive** for that key to one, and only one, column receiver input.
- **LCD Backlight Control** (LCD Devices Only) — The A05 Interface PCB applies filtered SW_VB to the A08 Backlight PCB when it receives an enable (LCD_BL_ON) from the A01 System PCB Display Controller. A separate backlight power supply is mounted on a metal bracket in the front case.

(Continued on next page)

Functional Description *(continued)*

A06 OEM PCB

A PCB used to integrate monitoring modes supplied to Medtronic by third parties, that is, original equipment manufacturers (OEMs), into the LIFEPAK 12 defibrillator/monitor system architecture. The A06 OEM PCB provides isolated power supplies, safety isolation, transient protection, and signal interface adapters to support hosted OEM modules.

Note: The A06 OEM PCB is not installed unless one or more options (SpO2, EtCO2, or NIBP) are installed.

A07 Contact PCB

Interfaces the LIFEPAK NiCd and SLA (sealed lead acid) battery edge connector with the LIFEPAK 12 defibrillator/monitor. The signals associated with the edge connector, clock, data, and detect, are not currently used by the device.

A08 Backlight PCB (LCD Devices Only)

A printed circuit board that contains the circuitry to light the A11 LCD Assembly screen. The contrast adjustment is through a programmable power supply on the A01 System PCB.

(Continued on next page)

Functional Description *(continued)*

A09 Small Keypad/ A10 Large Keypad

Common device controls (those not available using the Selector) are initiated through either the A09 Small Keypad and A10 Large Keypad. The number of keys on these keypads varies, depending on the features installed in a specific device. All keys, with the exception of POWER and SHOCK, are addressed by the user controls section of the A01 System PCB ASIC.

- The POWER control remains separate from the addressed keys because it is needed to activate and deactivate the device without ASIC interaction. Closures of the POWER control are applied to the A03 Power PCB On/Off Control block.
- The SHOCK control remains separate from the addressed keys as a matter of fail-safe design, thus preventing inappropriate activation under conditions of loss of CPU control. Operator initiated closures of the SHOCK control are applied in two places: the A01 System PCB ASIC and the A04 Therapy PCB Defibrillator Processor. The ultimate shock decision rests with both the ASIC and defibrillator processor agreeing to deliver defibrillation energy.

A11 LCD Assembly (Alternative to A11 EL Display Assembly)

A backlit 640 × 480 pixel LCD that displays the primary ECG waveforms (and secondary waveforms in devices with 100 mm printers) and text messages.

(Continued on next page)

Functional Description *(continued)*

A11 EL Display Assembly (Alternative to A11 LCD Assembly)	A high-resolution electroluminescent (EL) display for use in environments with variable ambient light and the requirement for a wide range of viewing angles.
A12 Printer Assembly	The LIFEPAK 12 defibrillator/monitor uses one of two printers: the 50 mm printer is used whenever the 12-lead ECG monitoring capability is absent; the 100 mm printer is installed to support 12-lead ECG monitoring.
A13 Transfer Relay	A high-voltage relay mounted in the rear case that routes current from the A15 Energy Storage Capacitor (by means of the A14 Waveshaping Inductor for monophasic, or the A22 BTE module for biphasic) through the W11 Therapy Connector Cable to the patient. Activation of the A13 Transfer Relay is governed by the A04 Therapy PCB **Transfer Relay Control** block.
A14 Waveshaping Inductor (Monophasic Devices Only)	An inductor used to modify the A15 Energy Storage Capacitor waveform into the monophasic defibrillation waveform. Terminals connect with the A17 Interconnect Bracket.
A14 Inductive Resistor (Biphasic Devices Only)	A resistor that conditions the energy storage capacitor output for the wave generator/regulator circuit on the A22 BTE module.

(Continued on next page)

Functional Description *(continued)*

A15 Energy Storage Capacitor (Monophasic Devices Only)	A metallized film capacitor used for energy storage. The capacitance of the A15 Energy Storage Capacitor is calculated when you run the **TCP – Defibrillation Calibration** procedure and the value is displayed as part of the **Service/Status/ Device Log** screen. The nominal value is 50 µF.
A15 Energy Storage Capacitor (Biphasic Devices Only)	A metallized film capacitor used for energy storage. The capacitance of the A15 Energy Storage Capacitor is calculated when you run the **TCP – Defibrillation Calibration** procedure and the value is displayed as part of the **Service/Status/ Device Log** screen. The nominal value is 195 µF.
A16 SpO2 Module	An OEM oximetry module supplied by Nellcor or Masimo. These patented modules perform all functions related to oxygen saturation measurement, including sensor drive. Measurement results pass serially by means of the A06 OEM PCB to the A01 System PCB ASIC for display.
A17 Interconnect Bracket	A terminal assembly used to interconnect the A13 Transfer Relay Assembly, the A14 Waveshaping Inductor (for monophasic), or the A22 BTE module (for biphasic), and the A15 Energy Storage Capacitor. The bracket itself is strapped to the A15 Energy Storage Capacitor with a large cable tie.
A17 Interconnect Bracket (Biphasic)	A terminal assembly used to interconnect the A13 Transfer Relay Assembly, A14 Waveshaping Inductor, and A15 Energy Storage Capacitor. The bracket itself is strapped to the A15 Energy Storage Capacitor with a large cable tie.

(Continued on next page)

Functional Description *(continued)*

A21 NIBP Module

An OEM NIBP monitor is supplied by CAS Medical Systems. This module performs blood pressure monitoring, determining systolic and diastolic pressures and pulse rate. Measurement results pass serially via the A06 OEM PCB to the A01 System PCB ASIC for display. Readings may be taken one time or on a recurring interval.

A22 BTE Module (Biphasic Devices Only)

The BTE Module generates the biphasic waveform. The energy from the A15 Storage Capacitor is shaped into the biphasic waveform. The energy passes through the A14 Inductive Resistor and A13 Relay to the W11 Therapy Connector.

A23 EtCO2 Module

An OEM capnometry module is supplied by Oridion Medical Ltd. This module continuously monitors end tidal carbon dioxide (EtCO2) and respiratory rate. Measurement results pass serially by means of the A06 OEM PCB to the A01 System PCB ASIC for display.

W07 ECG Connector Cable

A front panel connector used for attaching a 3-lead or 12-lead ECG cable. Signal processing takes place on the A01 System PCB **ECG Front End** processing circuitry.

W08 System Connector Cable

A rear panel connection used for the exchange of digital information with an external modem, personal computer, factory test systems, or Medtronic field service test systems. The system connector also supplies a real-time analog ECG signal for use in basic central monitoring or telemetry systems.

(Continued on next page)

Functional Description *(continued)*

W09 Auxiliary Connector Cable

A rear panel access port used for connection of ac or dc power adapters.

W11 Therapy Connector Cable

A patient connection port used for delivery of either defibrillation or pacing therapeutic energies. The therapy connector allows attachment of all available electrode accessories, including QUIK-COMBO pacing/defibrillation/ECG electrodes, adult external paddles, and internal paddles with discharge control.

Note: Some therapeutic accessories such as pediatric or posterior paddle attachments connect to the device by means of accessories mentioned previously.

The LIFEPAK 12 defibrillator/monitor uses varying jumper configurations within attached accessories to determine the type of accessory connected. Discriminator circuitry within the A04 Therapy PCB **Defibrillator Processor** subsystem decodes the accessory jumper configurations.

W15 Selector Assembly

A rotary optical pulse-code modulator used to navigate through and select specific items from the LIFEPAK 12 defibrillator/monitor menu system. Detent points within the Selector provide tactile feedback to the user. When the desired item has been highlighted on the display, the user presses the Selector knob to enter the selection. The Selector forms part of the user controls and indicators block. Pulses derived from the W15 Selector Assembly pass serially to the user controls portion of A01 System PCB **ASIC**.

Functional Description *(continued)*

W17 Speaker Assembly	Used to annunciate device warnings, alarms, tones and, in advisory mode, voice prompts. Drive for the W17 Speaker Assembly originates in the A01 System PCB **Combined Audio Output** block. Final amplification occurs in the A05 Interface PCB **Audio Amplifier**.
W22 SpO2 Connector Cable	A front panel connector on the parameter bezel used for attaching a Nellcor or Masimo SpO2 (Oximeter) sensor.
W28 CO2 Connector Assembly	A front panel connector used for attaching a CO2 Filterline. Signal processing takes place on the CO2 module.
W33 IP Connector Cable	A front panel connector used for attaching invasive pressure transducers.

Operating Instructions

The LIFEPAK 12 Defibrillator/Monitor Series Operating Instructions familiarize the operator with basic device functions and identify controls, indicators, and connectors. Qualified service personnel must consult both the LIFEPAK 12 Defibrillator/Monitor Series Operating Instructions and this service manual for a complete understanding of the use and maintenance of the device.

WARNINGS!

Possible improper device performance. Use only Medtronic QUIK-COMBO or FAST-PATCH electrodes and batteries described in this service manual. Substitution of electrodes or batteries supplied by a manufacturer other than Medtronic may cause the device to operate improperly.

Possible defibrillator shutdown. Always have access to spare, fully charged, properly maintained batteries. Immediately replace a battery when the device displays a depleted battery icon or when a LOW BATTERY **or** REPLACE BATTERY **warning message appears.**

Possible loss of power during patient care. Using improperly maintained batteries to power the LIFEPAK 12 defibrillator/monitor may cause premature power loss. Use the Battery Support System 2 or Mobile Battery Service Station (FASTPAK, FASTPAK 2, LIFEPAK NiCd, or LIFEPAK SLA batteries) to maintain and charge your device batteries.

Operating Instructions

Use the following links to the LIFEPAK 12 Defibrillator/Monitor Series Operating Instructions for operating procedures and related information.

(Continued on next page)

Operating Instructions *(continued)*

(Continued on next page)

Operating Instructions *(continued)*

(Continued on next page)

Operating Instructions *(continued)*

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Operating Instructions *(continued)*

(Continued on next page)

Operating Instructions *(continued)*

(Continued on next page)

Operating Instructions *(continued)*

Modes of Operation

When the LIFEPAK 12 defibrillator/monitor is turned on, it is always in one of five modes of operation. Choose from the following links to learn more about a particular operating mode.

Manual Mode

About Manual Mode and Entering Manual Mode

To enter manual mode, turn on the device and observe the ADVISORY indicator. If the ADVISORY indicator is off, you are in manual mode. If the ADVISORY indicator is on, then press the ADVISORY control to enter manual mode. The factory default response allows you direct access to manual mode. Other responses are: to confirm your action; to enter a manual mode passcode; or to deny manual mode access altogether (restricted). The response choice is selected in the MANUAL MODE option of the SETUP menu.

Mode/Response When Turned On	Response Description
Manual/Direct (default)	Turn on in Manual; direct access between advisory and manual modes
AED/Direct	Turn on in AED; direct access between advisory and manual modes
AED/Confirm Once	Turn on in AED; operator confirms manual mode selection once
AED/Confirm Always	Turn on in AED; operator confirms manual mode selection every time
AED/Passcode Once	Turn on in AED; operator enters manual mode passcode once
AED/Passcode Always	Turn on in AED; operator enters manual mode passcode every time
AED/Restricted	Turn on in AED; no access to manual mode

Automated External Defibrillator (AED) Mode

About AED Mode

To enter automated external defibrillator (AED) mode, turn on the device and observe the ADVISORY indicator. If the ADVISORY indicator is on, you are in AED mode.

If the ADVISORY indicator is off, press the ADVISORY control to enter AED mode. There are no restrictions when going from manual mode to AED mode.

To continue, refer to the **operating instructions — Therapy**.

Setup Mode

About Setup Mode

The operating defaults for the device are configured from the SETUP menu. Options include general characteristics, manual mode and AED mode operating characteristics, alarms setup, transmission sites, time-of-day clock, and many other items. After the setup is complete, turn off the device, which saves the configuration. The next time the device is turned on, the operating defaults you selected are active.

The information that follows, with references to the operating instructions, shows you the options available in the setup mode. There is also a Factory Reset option that resets the device to the factory default settings, except for transmission sites, output ports, initialization strings, and the maintenance interval, which remain unchanged.

Saving the Setup Configuration

If the owner of the device has a setup configuration that cannot be disturbed, you have two choices to preserve this setup. The first method is to **print the setup configuration.** When service is complete, you can verify the setup and then manually reset the configuration.

(Continued on next page)

Setup Mode *(continued)*

The second method is to **send the setup configuration** to another LIFEPAK 12 defibrillator/monitor. After service is complete, transfer the configuration back to the device.

Note: Saving the configuration with the **Transfer and Save Setup Procedure** requires that the software in the device being used for storing configuration information is of the same revision. Otherwise potentially unexpected results may occur once the configuration has been restored to the repaired device.

Note: When using the **Transfer and Save Setup Procedure**, the two devices must be the same energy configurations (both monophasic or both biphasic), the configuration information for default energy will be corrupted if devices are not the same energy configuration.

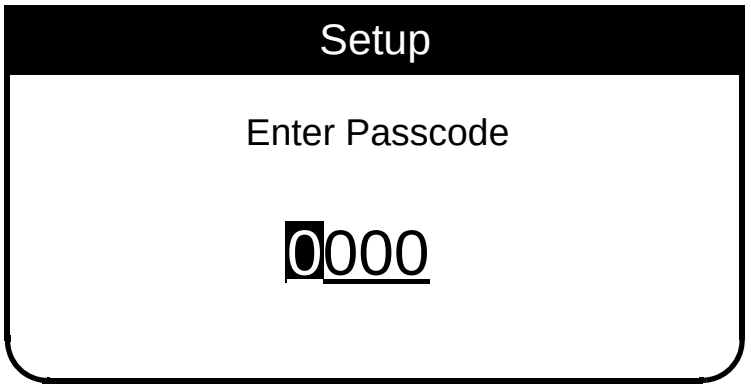
(Continued on next page)

Setup Mode *(continued)*

Entering Setup Mode

To enter **setup mode**:

1. Hold down both the OPTIONS and EVENT keys, then turn on the device. Continue holding until the passcode overlay appears on the SETUP screen.



2. The factory default is 0000; the reserved technician passcode is 5433. To enter the passcode, rotate the Selector to select a digit, then press the Selector to continue.

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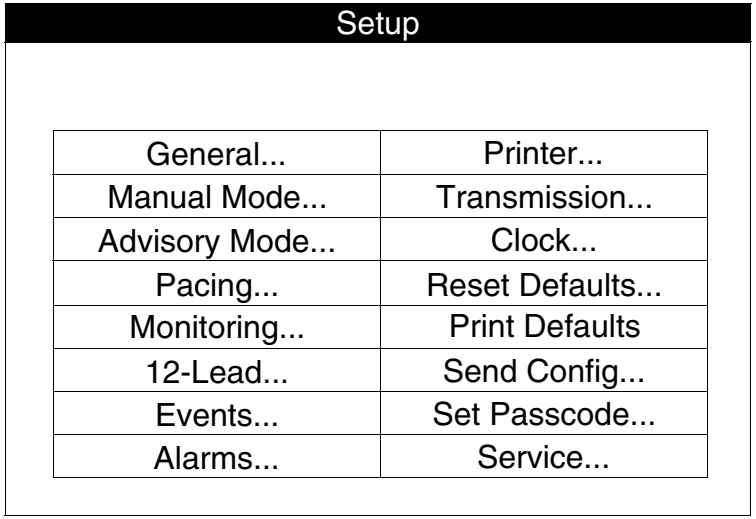
Setup Mode *(continued)*

Entering Setup Mode (continued)

After the last digit is entered, the SETUP menu appears.



3. Rotate the Selector to select a setup category, then press the Selector to display the category overlay.
4. To print the current device setup configuration, select PRINT DEFAULTS. To send the setup configuration to another device, select SEND CONFIG....
5. To enter service mode, continue to **Entering Service Mode**.
6. To continue, refer to **operating instructions – Defining Setup Options**.

Inservice Mode

About Inservice Mode

Inservice mode allows you to practice or demonstrate the monitoring functions of the LIFEPAK 12 defibrillator/monitor. This includes:

- ECG lead selection
- SpO2
- EtCO2
- NIBP
- IP 1
- IP 2
- Trend
- Alarms
- Events

Entering Inservice Mode

To enter inservice mode:

1. Remove all front panel cables from the device (therapy, ECG, and the like). You cannot enter inservice mode if any front panel cable is attached.
2. Hold down both the EVENT and HOME SCREEN keys, then turn on the device. Continue holding until the inservice mode message appears at the bottom of the display screen.
3. To continue, refer to the **operating instructions — Inservice Mode**.

Service Mode

About Service Mode

Service mode functions allow qualified service personnel to:

- Perform device calibration routines:
  - Defibrillation calibration
  - Pacing calibration
  - Printer calibration
  - CO2 calibration
  - NIBP calibration
  - Invasive Pressure
- Perform device tests:
  - Buttons test
  - Contrast test
  - Pixels test
  - Printer test
  - Voice/Tone test
- View the device status registers:
  - Device Log status
  - Error Log status
  - Counters status
  - Clear Memory
- Set the service mode passcode
- Set the maintenance prompt interval

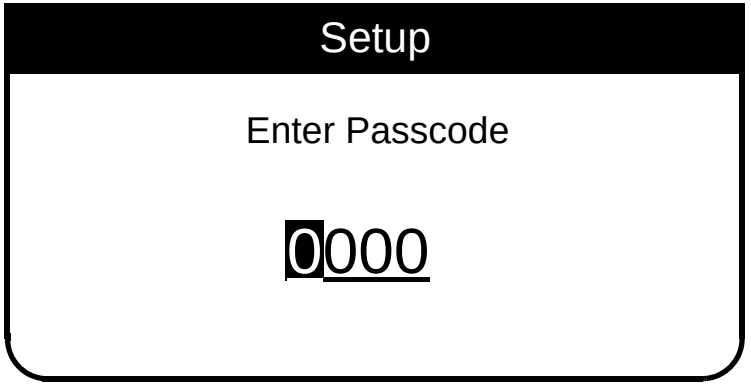
(Continued on next page)

Service Mode *(continued)*

Entering Service Mode

To enter service mode:

1. Hold down both the OPTIONS and EVENT keys, then turn on the device. Continue holding until the passcode overlay appears on the SETUP screen.



2. The factory default is 0000; the reserved technician passcode is 5433. To enter the passcode, rotate the Selector to select a digit, then press the Selector to continue. After the last digit is entered, the SETUP menu appears.

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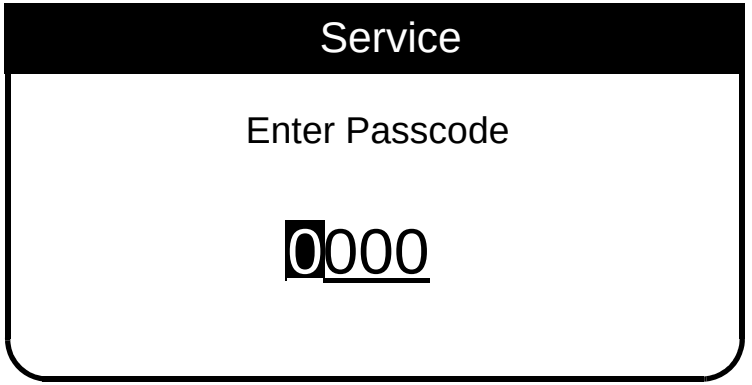
Service Mode *(continued)*

Entering Service Mode (continued)

3. Rotate the Selector to select SERVICE on the SETUP menu, then press the Selector. The passcode overlay appears on the SERVICE screen.



4. The factory default is 0000; the reserved technician passcode is 5433. To enter the passcode, rotate the Selector to select a digit, then press the Selector to continue.

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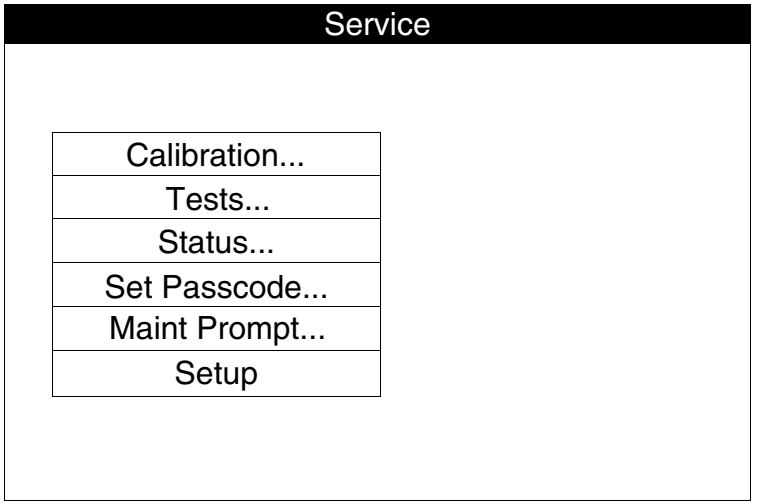
Service Mode *(continued)*

Entering Service Mode (continued)

After the last digit is entered, the SERVICE menu appears.



5. Rotate the Selector to select a service category, then press the Selector to display the category overlay.

   Calibration — Refer to **Test and Calibration Procedures (TCP)**

   Tests — Refer to **Performance Inspection Procedures (PIP)**

   Status — Refer to **Troubleshooting**

   Set Passcode — Allows the user to set a service mode passcode

   Maint Prompt — Refer to **Preventive Maintenance**

Performance Inspection Procedures

The Performance Inspection Procedures (PIP) are a set of manual test procedures used for an operational closed-case evaluation of the LIFEPAK 12 defibrillator/monitor. This section describes the test procedures you will perform to determine if the LIFEPAK 12 defibrillator/monitor is operating within the required specifications. Investigate and correct any malfunctions or out-of-tolerance conditions detected during the PIP.

The PIP comprises safety and performance tests recommended by AHA/ASHE (American Hospital Association/American Society for Hospital Engineering) *Maintenance Management for Medical Equipment* and International Electrotechnical Commission (IEC) Technical Report 1288-2, *Maintenance of Cardiac Defibrillators-Monitors*.

Perform the PIP as part of a regularly scheduled preventive maintenance routine. Also, perform the PIP after any repair, replacement, or **TCP calibration** procedure. The **PIP Checklist** is provided as an optional tool for recording test results. Also refer to the **Operator Checklist** for additional items.

Performance Inspection Procedures (continued)

PIP – Modem PC Card
PIP – LIFENET BLUE
PIP – Voice Recorder Accessory
PIP – LP12 Maintenance Due Instruction
PIP – Power Adapters
PIP – Checklist

PIP – Scope and Applicability

The PIP applies to the LIFEPAK 12 defibrillator/monitor only. To complete the PIP, you perform the manual tests outlined in the **PIP – Instructions** section of this Service Manual. All required PIP tests applicable to the LIFEPAK 12 defibrillator/monitor configuration under test must be performed.

Refer to the **PIP – Resource Requirements** for a list of the necessary qualifications for PIP equipment, test equipment verification, workstation power, and personnel.

Refer to the **PIP – Test Equipment Requirements** for a list of test equipment, including specifications, required to complete the PIP.

The **PIP Checklist** is provided as an optional tool for recording test results.

PIP – Resource Requirements

This section describes the requirements for PIP equipment, PIP test equipment verification, PIP workstation power, and PIP personnel.

PIP – Equipment

To perform the PIP, you must use the equipment listed in the **PIP – Test Equipment Requirements** table. Although the table lists specific test equipment by manufacturer, test equipment with equivalent specifications may be substituted.

Note: Using test equipment other than that specified in the **PIP – Test Equipment Requirements** table may provide test results that are different from those specified in this manual. It is the responsibility of the biomedical personnel who maintain this device to determine test equipment equivalency.

PIP – Test Equipment Verification

All test equipment used to perform the PIP must have a current calibration label, issued by a certified calibration facility.

PIP – Workstation Power

The ac line power to the workstation used must be connected to a grounded power source.

PIP – Personnel

Technicians who perform the PIP must be properly qualified and thoroughly familiar with the operation of the LIFEPAK 12 defibrillator/monitor, meeting the requirements described in **Service Personnel Qualifications**.

PIP – Test Equipment Requirements

The following is a list of test equipment required to conduct the PIP.

Equipment	Specifications	Manufacturer
Defibrillator Analyzer[1]	Energy range: 0 to 450 J Load resistance: 50 Ω ±1% Accuracy: ±2% +2 J Waveforms: NSR, VF, and Sine Wave	Fluke Biomedical QED-6H™, with test posts accessory (Software Version 2.07, or later) or equivalent
Patient Simulator[2]	Simultaneous 12-lead output Rates: 30 bpm, 120 bpm @ 1 mv Rate accuracy: ±1%, Blood Pressure accuracy ±1% full scale, ±1 MMHg	Fluke Biomedical DNI 215A/217A (with accessory cable [3010-0116] for invasive blood pressure measurement) or equivalent
Safety Analyzer	110 or 220 Vac line voltage Current range: 0-1999 μA Current accuracy: 5% of reading or 1 digit (whichever is greater)	Fluke Biomedical - Dale Model 601 (120 vac line input) or 601E (240 vac line input) or equivalent
Decade Resistance Box	0 to 9 MΩ resistance box Resolution: 1 Ω; Accuracy: ±1%	IET RS-200 Resistance Substituter or equivalent

1. Some energy meters are not accurate for biphasic waveforms; contact your defibrillator analyzer's manufacturer for more information.

2. The patient simulator used for blood pressure verification must be accurate to ±2%. The specifications in this procedure may not be met by a simulator with lesser accuracy.

(Continued on next page)

PIP – Test Equipment Requirements *(continued)*

Equipment	Specifications	Manufacturer
QUIK-COMBO test post adapter	Connects to QUIK-COMBO Therapy Cable	Medtronic MIN 3005302
AC Power Adapter	Input power: 120/230 vac, 50/60 Hz	Medtronic MIN 3010942
Stop Watch	Elapsed timer (minutes, seconds)	ACCUSPLIT 705X or equivalent
3-Lead ECG cable	Standard accessory with the 3-Lead LIFEPAK 12 Defibrillator/Monitor	Medtronic MIN 3006218
12-Lead ECG cable	Standard accessory with the 12-Lead LIFEPAK 12 Defibrillator/Monitor	Medtronic MIN 805265
General purpose oscilloscope	Bandwidth: dc to 2 MHz Vertical accuracy: ±3% (5 mv – 5 v/div.) Horizontal Time Base Accuracy: ±5%	Fluke 192B or equivalent
Nellcor SpO2 Oximeter Sensor	Adult finger sensor – DS100A	Medtronic MIN 3009086-03
Masimo SpO2 Oximeter Sensor	Adult finger sensor	Medtronic MIN 3201655-003
LIFEPAK NiCd Battery	NiCd battery with fuel gauge	Medtronic MIN 3009376
LIFEPAK SLA Battery	Sealed Lead Acid with fuel gauge	Medtronic MIN 3009378-03
FASTPAK Battery	NiCd battery	Medtronic MIN 09-10424
FASTPAK 2 Battery	NiCd battery with fuel gauge	Medtronic MIN 3009375

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PIP – Test Equipment Requirements *(continued)*

Equipment	Specifications	Manufacturer
NIBP Calibration Kit w/ Syringe 12 ft. Pressure Hose Pressure/Vacuum Meter	 1% Accuracy for pressure and vacuum	Medtronic MIN 3012432-01 Medtronic MIN 3009167-013 Fluke Biomedical - Dale 21 or equivalent
CO2 Calibration Kit Calibration Gas CO2 FilterLine CO2 Leak Test Fixture	 5% CO2, bal. 95% N2 XS04667	Medtronic MIN 3012430-01 Medtronic MIN 3012556-001 Medtronic MIN 3012176-003 Medtronic MIN 3012430-00
Nellcor SpO2 DB-9 Extender Cable	9-pin D-connector; male/female	Medtronic MIN 3009086-006 or Nellcor DEC-4
Nellcor SpO2 Safety Analyzer Test Lead	ECG Snap Connector to DB-9 Male (pin 3)	Fabricate from available parts
Masimo SpO2 Test Cable Assy.	ECG Snap Connector to Masimo Connector (pin 1)	Medtronic MIN 3201832-004, 005 or 006
ECG 12-Lead Switch Box (Optional) [No longer available from Fluke Biomedical]	Provides connections for ECG lead wire snaps, and allows selection of any individual lead or a combination of all leads.	Dale SW 14 Switch Box
Analog ECG Output Cable	Connects to the System Connector	Medtronic MIN 3010484

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PIP – Test Equipment Requirements *(continued)*

Equipment	Specifications	Manufacturer
Modem PC Card	USR® 56K, with adapter cable 3Com® Megahertz 33.6, with adapter cable Motorola® Montana 33.6, with adapter cable	Medtronic MIN 3010294-005 Medtronic MIN 3010294-002 Medtronic MIN 3010294-001
Bluetooth Card (LIFEPAK 12) (Laptop PC Card) (USB Connection)	TDK® BLU2i PCMCIA Card TDK GoBlue PCMCIA PC Card TDK GoBlue USB Adapter	Medtronic MIN 3203822-000 Medtronic MIN 3203824-000 Medtronic MIN 3203821-000
QUIK-COMBO Therapy Cable		Medtronic MIN 3006570
Standard Paddles		Medtronic MIN 3006228
LIFEPAK12 Defibrillator/Monitor with voice recorder. LIFEPAK12 Voice Recorder Software Package Assembly. Running PC host equipped with USB port.	Software version 3011371-095 or later configured for voice recorder. Software version V5.0.2 or later. Windows 2000, Windows XP	Medtronic MIN 3011317 Medtronic MIN 3203824

PIP – Instructions

PIP – General Instructions

This section lists the general instructions for performing the Performance Inspection Procedure (PIP).

- All required PIP tests applicable to the LIFEPAK 12 defibrillator/monitor configuration under test must be performed.
- The **PIP Checklist** is provided as an optional tool for the recording of test results.

Refer to **Troubleshooting** to correct failures, then repeat the PIP.

Note: Throughout the body of this PIP, the LIFEPAK 12 defibrillator/monitor will be referred to as the device.

PIP – Exterior Physical Inspection

To perform an exterior physical inspection:

1. Inspect the device exterior for the following:
   - Damage
   - Excessive wear
   - Improper mechanical function
   - Damaged connectors
2. Pick up and turn over the device and listen for loose or rattling hardware. Locate any loose or rattling hardware and tighten or replace it.

(Continued on next page)

PIP – Instructions *(continued)*

PIP – Exterior Physical Inspection (continued)

3. Inspect the rubber feet on the underside of the lower enclosure. Reinstall or replace rubber feet as necessary.
4. Inspect the battery connector pins for the following:
   - Tighten loose pins.
   - Examine each leaf on the connector pins to make sure it is not cracked or broken.
   - Replace bent, broken, corroded, worn, or damaged pins using the **Battery Pin Replacement** procedure.
5. Visual Inspection of the Therapy Connection Interface:
   - Inspect Therapy Connector on front of the device. Check that the Therapy Connector Seal appears to have a symmetrical fit around the Therapy Connector (3006216-004 or greater).
6. Perform a Therapy Cable Fit Check:

   Note: Verify locking feature is functional prior to engaging a Therapy Cable into the Therapy Connector.

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PIP – Instructions *(continued)*

PIP – Exterior Physical Inspection (continued)

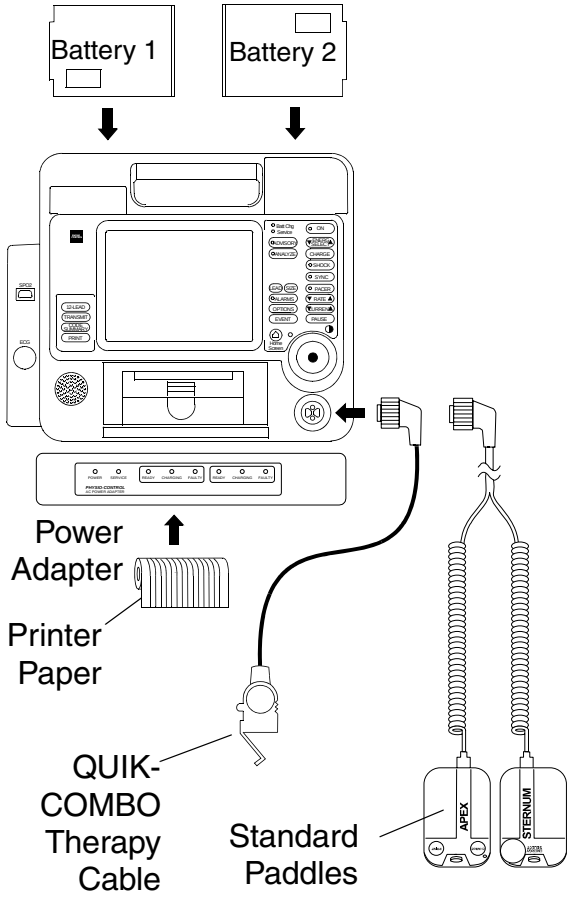
- Utilizing a Therapy Cable, install the cable to the Therapy Connector. The locking feature must engage (locking feature rotate over) without assistance, accompanied by an audible click.
- If the therapy connection fails the function fit check, a repair action is warranted on the therapy connector interface.

Note: It is not permissible to use lubricants on the seal or mating parts.

7. Inspect the ECG, SpO2*, CO2*, NIBP*, IP*, Power, and System connectors for damage, cracks, or contamination. *(if equipped)
8. Inspect the keypads and overlays for damage, cracks, separations or intermittent keys.
9. Inspect the pins and connector housings of all QUIK-COMBO, Standard Paddles and other therapy cables for damage.
10. Check all other accessory cables, ECG, SpO2 sensors, CO2 tubing, NIBP tubing, and related items for expiration dates, general condition, and suitability for use.
11. Inspect carrying strap and mounts (if the device is equipped with them).
12. Record the results on the **PIP Checklist**. **A**

PIP – Instructions *(continued)*

PIP – Setup



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WARNING!

Shock hazard. The device discharges up to 360 J of electrical energy through the defibrillator cable. You must safely discharge this electrical energy as described in this PIP. Do not attempt to perform this procedure unless you are thoroughly familiar with the operation of the device.

Set up the device in preparation for the PIP:

1. Insert two fully functional batteries into the device. A functional battery is one that does not return a LOW BATTERY message after turning on the device.
2. Verify that each battery clicks into position in the battery wells.
3. Use 50 mm or 100 mm paper, whichever is appropriate for the device.
4. Connect the QUIK-COMBO Therapy Cable (or optional Standard Paddles) to the Therapy Connector.

   Note: If the device is outfitted with Standard Paddles, follow those PIP tests specific to Standard Paddles instead of the tests specific to QUIK-COMBO.

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PIP – Instructions *(continued)*

PIP – Setup (continued)

Set up the device for manual mode access:

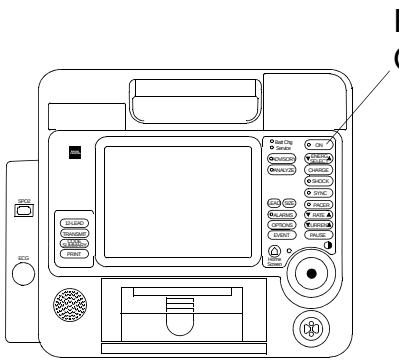
Note: It is most convenient if the device is set up for manual mode when performing the PIP. Follow the MANUAL ACCESS directions provided in the **operating instructions – Defining Setup Options** section to set the device to turn on in MANUAL/DIRECT mode. If you do not wish to change the setup for a device configured with MANUAL ACCESS restrictions, it may be necessary to use the reserved technician passcode of **5433** to gain access to manual mode.

Note: Be sure to restore the device to the user selected MANUAL ACCESS mode at the completion of this PIP.

1. Enter the **setup** mode.
2. Select the MANUAL MODE… menu option.
3. Select the MANUAL ACCESS option from the MANUAL MODE… submenu.
4. Record the user-selected manual access choice (for example, MANUAL/DIRECT, AED/CONFIRM ONCE, AED/RESTRICTED, and so forth) on the **PIP Checklist**. **B**
5. Turn off the device.
6. Continue to the next test.

PIP – Instructions *(continued)*

PIP – Power On/ Self-Test



To perform the PIP Power On/Self-Test:

1. Press ON to initiate the device nominal 5-second power-on self-test routine.
2. Verify the display lights. The initial display includes the words SELF TESTS IN PROGRESS... and the software version number.
3. Record the software version in the **PIP Checklist**, **1a** for example, 3011371-101.
4. Verify that all front panel indicators flash on (except the ON indicator, which glows steadily) for approximately 0.5 seconds during the self-test.
5. Verify that the speaker emits a clear, single beep test tone.
6. Verify that the power ON indicator remains lit after self test.
7. Verify that the BATT CHG indicator is off. This indicator is on only when a power adapter is powering the device.
8. Record that the SERVICE indicator is off in the **PIP Checklist**, **1b**

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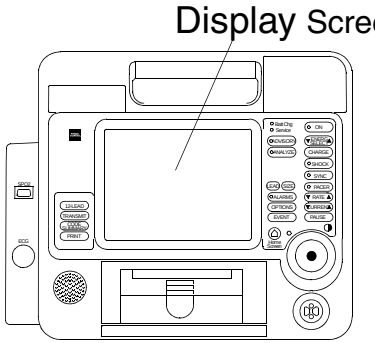
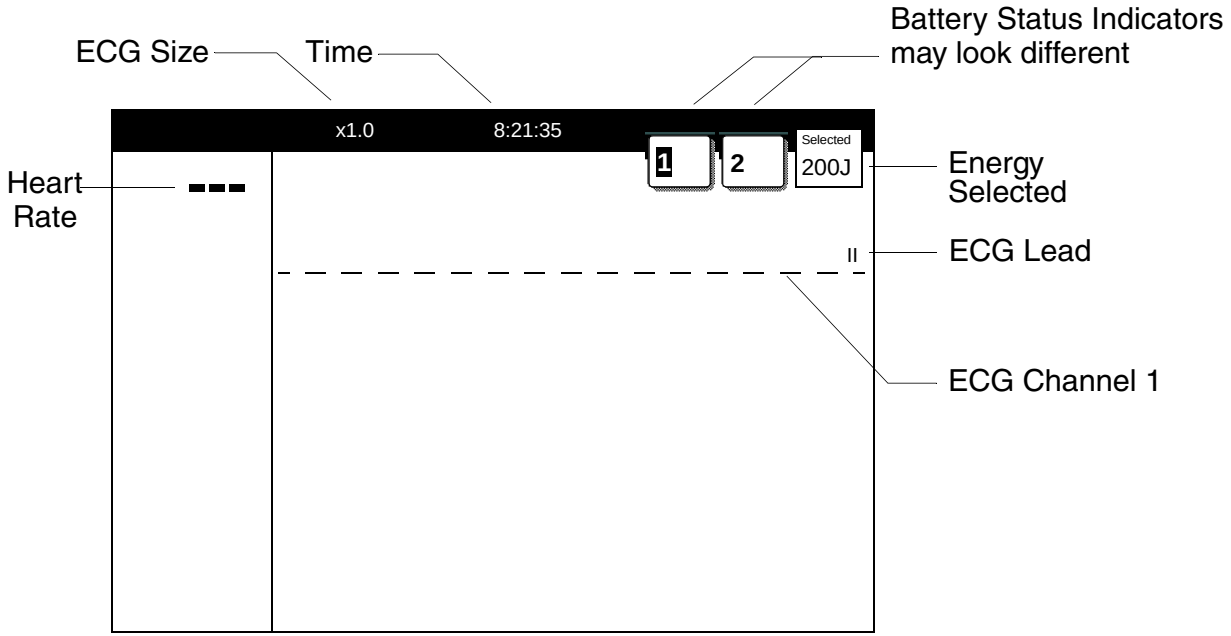
PIP – Instructions *(continued)*

PIP – Power On/ Self-Test (continued)



9. Verify the display screen appears similar to that shown below.

   Note: (LCD only) To adjust the LCD contrast, press the contrast control ◐, rotate the Selector to the desired contrast, then press the Selector.

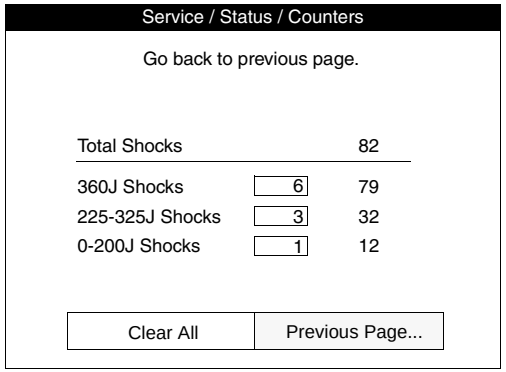


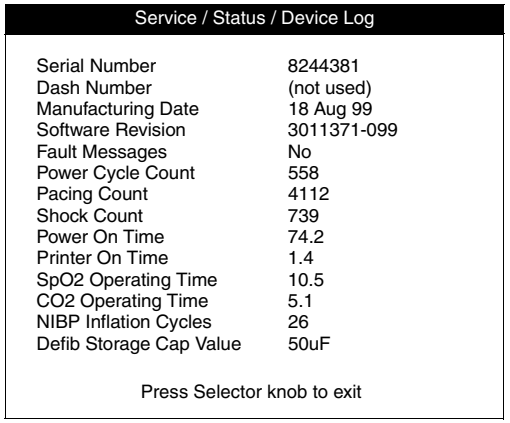
10. Turn off the device.

11. Record the results on the **PIP Checklist**. **1c**

PIP – Instructions *(continued)*

PIP – Record Operating Data





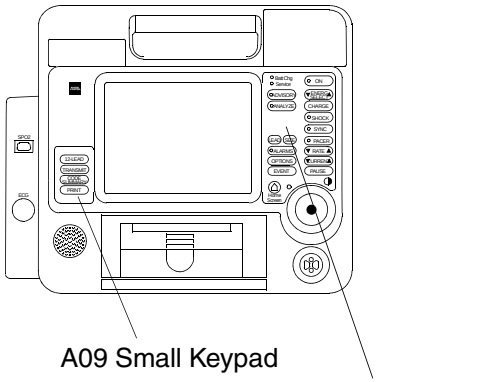
To record the operating data:

1. Hold down both the OPTIONS and EVENT keys, and then turn on the device. Continue holding until ENTER PASSCODE appears. Enter passcode 5433.
2. Select SERVICE from the SETUP menu. Enter passcode 5433.
3. Navigate to SERVICE/STATUS/COUNTERS.
4. Record the shocks since last reset (in boxes) and total shocks since the device was built. Select CLEAR ALL to reset box counters (if desired).
5. Select PREVIOUS PAGE.
6. Select DEVICE LOG. Record data from both screens on the **PIP Checklist**: **2**
   Power Cycle Count
   Pacing Count (if pacing option installed)
   Shock Count
   Power On Time
   Printer On Time
   SpO2 Operating Time (if SpO2 option installed)
   CO2 Operating Time (if CO2 option installed)
   NIBP Inflation Cycles (if NIBP option installed)
   Defib Storage Cap Value (only for monophasic devices)
7. Press the Selector to exit, then the HOME SCREEN key for the SERVICE menu.
8. Continue to the next test while still in service mode.

(Continued on next page)

PIP – Instructions *(continued)*

PIP – Keypads



A09 Small Keypad

A10 Large Keypad

To test the keypads:

1. Select TESTS… from the SERVICE menu.
2. Select BUTTONS from the SERVICE/TEST submenu.
3. Press each front panel control when prompted by the flashing control legend (although you may press the controls in any order).

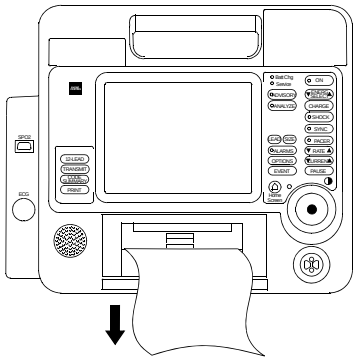
   Note: The keypad display may include LEAD and SIZE keys. If these keys are not present on your keypad, disregard these text boxes.
4. Verify with each control pressed that its associated text box is highlighted.

   Note: A failure is indicated by a control text box that is not highlighted. It is normal for the controls with up/down arrows to highlight only the arrows.
5. Press the Selector at the end of the test.
6. Record the results on the **PIP Checklist**. **3**
7. Continue to the next test while still in service mode.

(Continued on next page)

PIP – Instructions *(continued)*

PIP – Printer



Note: 100 mm printer shown.

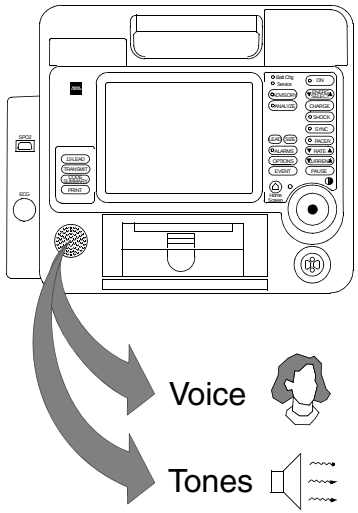
To test the 100 mm printer:

1. Select PRINTER… from the SERVICE menu.
2. Select START to print a test strip.
3. Inspect the test strip for the following attributes:
   - The large “X” form is printed without missing dots.
   - Seven horizontal lines (one very close to the lower paper margin).
   - The character set is printed clearly without broken characters.
   - Vertical lines spaced 25 mm ±5% apart. (Refer to **TCP – Printer Calibration**.)
4. Open the printer door and verify the CHECK PRINTER message appears at the bottom of the screen.
5. Close the printer door.
6. Select PREVIOUS PAGE to return to the SERVICE/TESTS submenu.
7. Record the results on the **PIP Checklist**. **4**
8. Continue to the next test while still in service mode.

(Continued on next page)

PIP – Instructions *(continued)*

PIP – Audio



To test the device voice prompts and tones:

1. Select VOICE/TONE… from the SERVICE/TESTS submenu.
2. Select START. Voice prompts sound in the speaker.
3. When satisfied that the voice prompts are clearly audible and reproduced without distortion, turn off the device.

   Note: You may listen to a complete replay of all voice prompts and tones, but it is not required for verification of this function.
4. Record the results on the **PIP Checklist**. **5**
5. Turn off the device.
6. This completes PIP testing using the service mode test feature.
7. Continue to the **next test**.

(Continued on next page)

PIP – Instructions *(continued)*

PIP – Biphasic Energy Setting Test

This test checks the lowest available energy level for a standard (domestic) biphasic device and a reduced energy biphasic device.

Note: Complete only if the device is a biphasic device. **Skip to Next Test**

1. Enter the setup mode. Hold down OPTIONS and EVENT controls and turn on the device. Enter passcode 5433.
2. Select the ADVISORY MODE… menu option.
3. Select the ENERGY PROTOCOL… menu option.
4. Select the ENERGY 1… menu option.
5. Verify the device‘s lowest available value for energy 1 is as shown below depending on which device type is being tested.

Device Type	Lowest Energy 1 Setting Allowable
Standard (USA)	200 J
Reduced Energy	150 J

6. Record the results on the **PIP checklist**. **6**
7. Turn off the device. Continue to next test, **PIP - User Test**.

PIP – Instructions *(continued)*

PIP – User Test

To perform User Test:

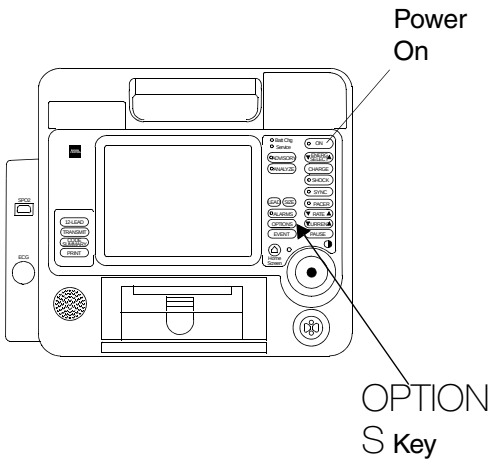
1. Press ON to turn on the device.
2. Press OPTIONS to access User Test.

   When selected, the User Test automatically performs the following tasks:

   – Performs self-tests
   – Charges to 10 J and discharges internally (this energy is not accessible at the therapy connector)
   – Prints a Pass/Fail report
3. Record the results on the **PIP Checklist**. **7**
4. Continue to the next test, **Date and Time**.

PIP – Instructions *(continued)*

PIP – Date and Time



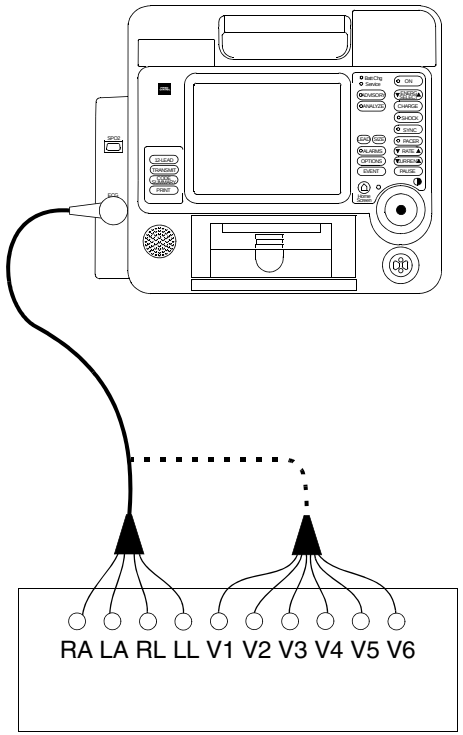
To verify the device date and time:

1. Press the OPTIONS key.
2. Select DATE/TIME... from the OPTIONS menu.
3. Verify that the correct date and time values are displayed on the screen.

   Note: If the date and time are incorrect, set the date and time as needed.
4. Record the results on the **PIP Checklist**. **8**
5. Turn off the device.
6. Continue to next test, **PIP - 12-Lead ECG Characteristics**.

PIP – Instructions *(continued)*

PIP – 12-Lead ECG Characteristics



Dynatech 215A/217A
Patient Simulator

To test 12-Lead ECG Leads Off detection: (Use Customer's ECG cable)

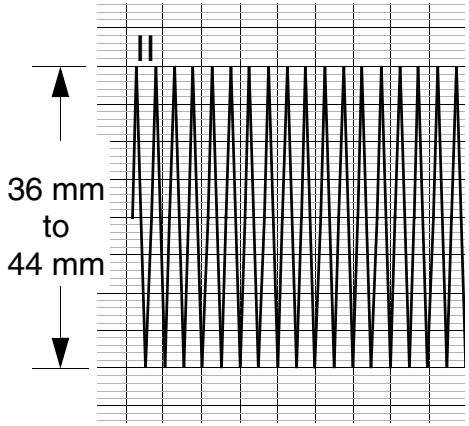
Note: If your device does not have a 12-LEAD control on the A09 Small Keypad, perform the **PIP – 3-Lead ECG Characteristics** test instead.

1. Connect the Main ECG cable, with the Limb Lead and Precordial Lead attachments, and connect all 10 ECG leads to the patient simulator.
2. Program the patient simulator output for a 60 BPM, NSR.
3. Set the device lead selection to LEAD II.
4. Remove the LL lead from the patient simulator.
5. Verify the device displays a LEADS OFF screen message.
6. Reconnect the LL lead.
7. Repeat steps 4 through 6 for the RA and RL leads.
8. Press the 12-LEAD button, then press the Selector.
9. Verify the device display shows ACQUIRING 12-LEAD.
10. Remove the LA lead from the patient simulator.
11. Verify the device displays a LEADS OFF screen message.

(Continued on next page)

PIP – Instructions *(continued)*

PIP – 12-Lead ECG Characteristics (continued)



Lead	Printed Peak-to-Peak
I	18 mm to 22 mm
II	36 mm to 44 mm
V1	36 mm to 44 mm
V2	36 mm to 44 mm
V3	36 mm to 44 mm
V4	36 mm to 44 mm
V5	36 mm to 44 mm
V6	36 mm to 44 mm

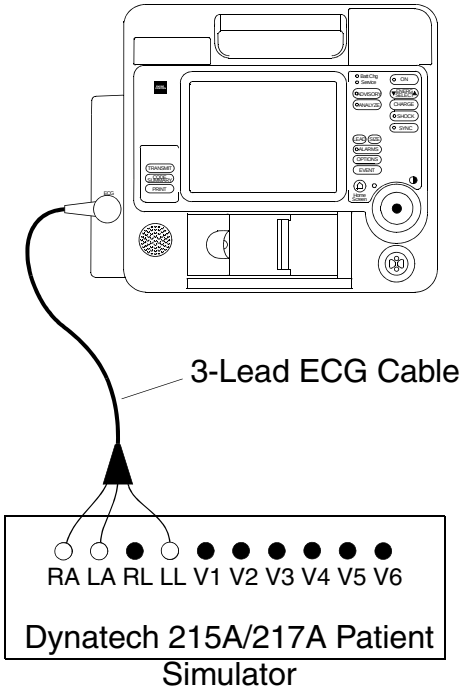
12. Reconnect the LA lead.
13. Repeat steps 8 through 12 for the V1, V2, V3, V4, V5, and V6 leads.
14. Record the results on the **PIP Checklist**. **9a**

To test 12-Lead ECG gain:

1. Program the patient simulator output for a 1 mv, 10 Hz sine wave.
2. Set the ECG SIZE to 4.0.
3. Set the device lead selection to LEAD II.
4. Record 5 seconds of ECG LEAD II and confirm the printed signal amplitude is 36 mm to 44 mm peak-to-peak as shown at the left.
5. Repeat steps 3 and 4 for leads I, V1, V2, V3, V4, V5, and V6, substituting the signal amplitudes given in the table at the left.
6. Record the results on the **PIP Checklist**. **9b**
7. Continue to next test, **PIP - QUIK-COMBO Delivered Energy**.

PIP – Instructions *(continued)*

PIP – 3-Lead ECG Characteristics



Note: If 12-Lead ECG Characteristics test was completed, skip to **next test**.

To test 3-Lead ECG Leads Off detection: (Use Customer's ECG cable)

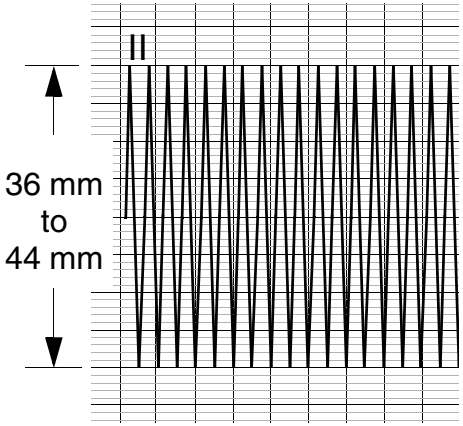
Note: If your device has a 12-LEAD control on the A09 Small Keypad, perform the **PIP – 12-Lead ECG Characteristics** test instead of this test.

1. Connect the 3-Lead ECG Cable between the device and patient simulator as shown at the left.
2. Program the patient simulator output for a 60 BPM, NSR.
3. Set the device lead selection to LEAD II.
4. Remove the LL lead from the patient simulator.
5. Verify the device displays an LL LEADS OFF screen message.
6. Reconnect the LL lead.
7. Repeat steps 4 through 6 for the RA lead.
8. Remove the LA lead from the patient simulator and verify the device displays the ECG LEADS OFF screen message.
9. Record the results on the **PIP Checklist**. **9a**

(Continued on next page)

PIP – Instructions *(continued)*

PIP – 3-Lead ECG Characteristics (continued)



Lead	Printed Peak-to-Peak
I	18 mm to 22 mm
II	36 mm to 44 mm

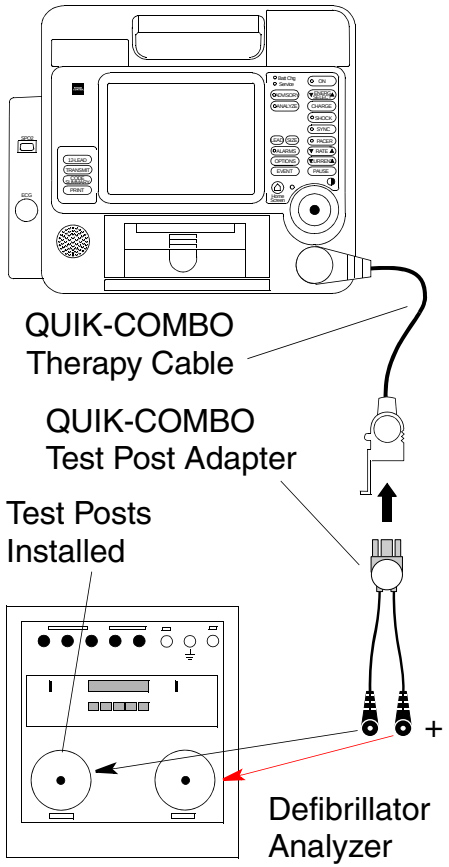
10. Reconnect the LA lead, then continue directly to the next page with this setup in place.

To test 3-Lead ECG gain:

1. Program the patient simulator output for a 1 mv, 10 Hz sine wave.
2. Set the ECG SIZE to 4.0.
3. Set the device lead selection to LEAD II.
4. Record 5 seconds of ECG LEAD II and confirm the printed signal amplitude is 36 mm to 44 mm peak-to-peak as shown at the left.
5. Repeat steps 3 and 4 for LEAD I, substituting the signal amplitudes given in the table at the left.
6. Record the results on the **PIP Checklist**. **9b**
7. Continue to next test, **PIP - QUIK-COMBO Delivered Energy**.

PIP – Instructions *(continued)*

PIP – QUIK-COMBO Delivered Energy



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To test delivered energy using QUIK-COMBO electrodes:

Note: For Standard Paddle equipped device, continue to **PIP – Standard Paddles Delivered Energy**.

Note: For a biphasic device, use a defibrillation analyzer specified for biphasic waveforms. Refer to the **PIP – Test Equipment Requirements table**.

1. Set up the device and defibrillator analyzer as shown.
2. Turn on the device, then press the ENERGY SELECT control to select 10 J.
3. Press the CHARGE control and wait for the device to reach full charge. Then press the SHOCK control to discharge the device.

(Continued on next page)

PIP – Instructions *(continued)*

PIP – QUIK-COMBO Delivered Energy (continued)

4. Verify the defibrillator analyzer indicates the delivered energy is within the acceptable output limits shown below.

Energy Level (J)	Acceptable Output (J)
10	9.0 to 11.0
200	186.0 to 214.0
360	334.8 to 385.2

5. Repeat steps 2 through 4 for the remaining energy levels specified in the table.

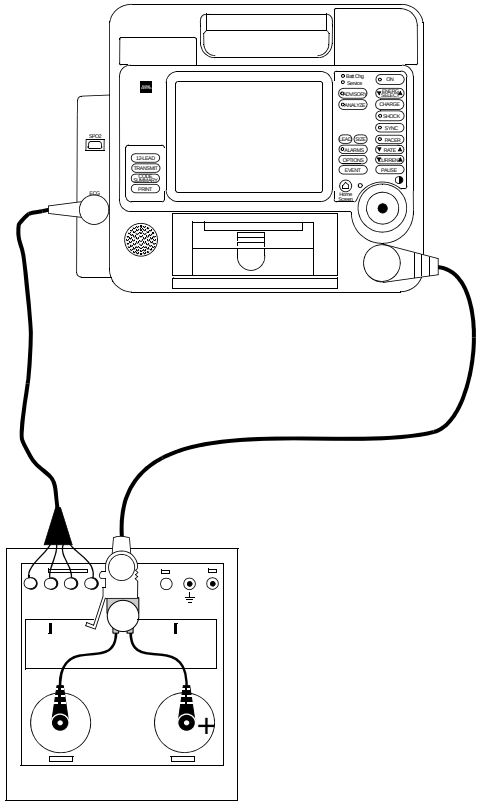
   Note: Perform the **TCP – Defibrillator Calibration** if the delivered energy falls outside of the acceptable output range.

6. Record the results on the **PIP Checklist**. **10**

7. Continue to next test, **PIP – QUIK-COMBO Synchronous Cardioversion**.

PIP – Instructions *(continued)*

PIP – QUIK-COMBO Synchronous Cardioversion



To test Synchronous Cardioversion using QUIK-COMBO electrodes:

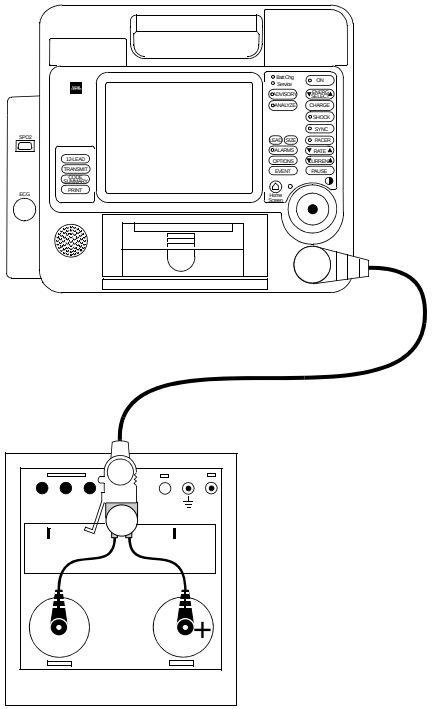
WARNING!

Shock hazard. Electrical energy is discharged during this procedure. Do not allow the electrodes to contact any person or conductive surfaces except as described below.

1. Connect the main ECG cable between the device and patient simulator.
2. Set the device ECG SIZE to 1.0. Select Lead II. Set the defibrillator analyzer to measure SYNC.
3. Press the SYNC control on the device.
4. Verify the SYNC control LED turns on and R-wave markers appear on the ECG waveform.
5. Charge the device to 10 J. Upon reaching full charge, press the SHOCK control to discharge the device.
6. Verify the defibrillator analyzer measures a sync delay of 60 ms or less.
7. Record the results on the **PIP Checklist**. **11**
8. Continue to next test, **PIP – QUIK-COMBO ECG Characteristics**.

PIP – Instructions *(continued)*

PIP – QUIK-COMBO ECG Characteristics



To test QUIK-COMBO ECG gain:

1. Program the defibrillator analyzer output for a 1 mV, 10 Hz sine wave.
2. Set the device ECG SIZE to 4.0.
3. Set the device lead selection to PADDLES.
4. Record 10 seconds of PADDLES ECG and confirm the printed signal amplitude is 36 mm to 44 mm peak-to-peak.

   Note: The BIO-TEK QED-6 produces a 1.1 mV output; confirm the printed signal amplitude is 38 mm to 50 mm peak-to-peak.
5. Record the results on the **PIP Checklist**. **12a**
6. Continue to the next page with this setup in place.

(Continued on next page)

PIP – Instructions *(continued)*

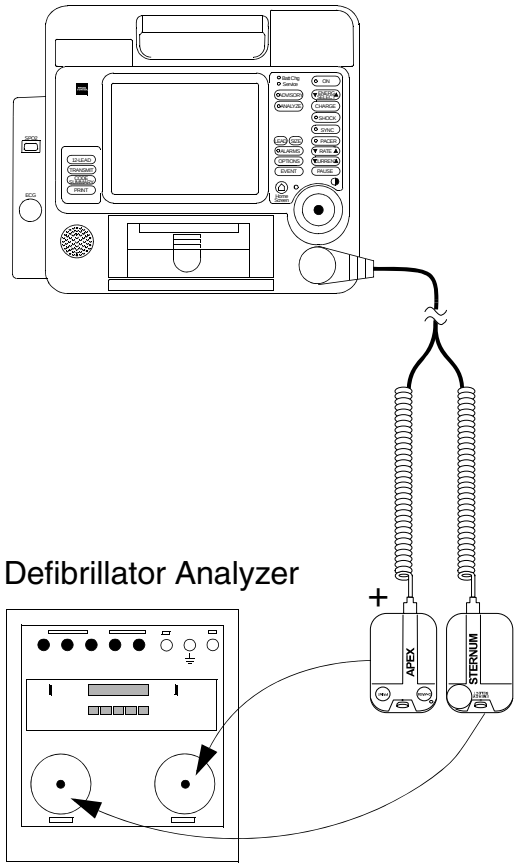
PIP – QUIK-COMBO ECG Characteristics (continued)

To test QUIK-COMBO ECG fast restore:

1. Program the defibrillator analyzer output for a 30 BPM, NSR.
2. Set the device ECG SIZE to 4.0.
3. Charge the device to 360 J.
4. Upon reaching full charge, press the PRINT control to begin recording.
5. Discharge the device into the defibrillator analyzer.
6. Allow the printer to run until the defibrillation event and associated ECG waveform finishes printing.
7. Press the PRINT control to turn the printer off.
8. Note the Shock # and ENERGY DELIVERED event mark and verify the ECG returns to the baseline in 0.5 seconds (12.5 mm) or less.
9. Record the results on the **PIP Checklist**. **12b**
10. Continue to next test, **PIP – Advisory Mode Test**.

PIP – Instructions *(continued)*

PIP – Standard Paddles Delivered Energy



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Note: For QUIK-COMBO equipped devices, continue to **PIP - QUIK-COMBO Delivered Energy**.

To test delivered energy using Standard Paddles:

Note: For a biphasic device, make sure the defibrillation analyzer is compatible. Refer to the **PIP – Test Equipment Requirements table**.

1. Set up the device and defibrillator analyzer as shown.
2. Rotate the STERNUM PADDLE ENERGY SELECT dial to select 10 J.
3. Press the Apex paddle CHARGE button and wait for the device to reach full charge. Then press the paddles SHOCK switches to discharge the device.

(Continued on next page)

PIP – Instructions *(continued)*

PIP – Standard Paddles Delivered Energy (continued)

4. Verify the defibrillator analyzer indicates the delivered energy is within the acceptable output limits, shown below.

Energy Level (J)	Acceptable Output (J)
10	9.0 to 11.0
200	186.0 to 214.0
360	334.8 to 385.2

5. Repeat steps 2 through 4 for the remaining energy levels specified in the table.

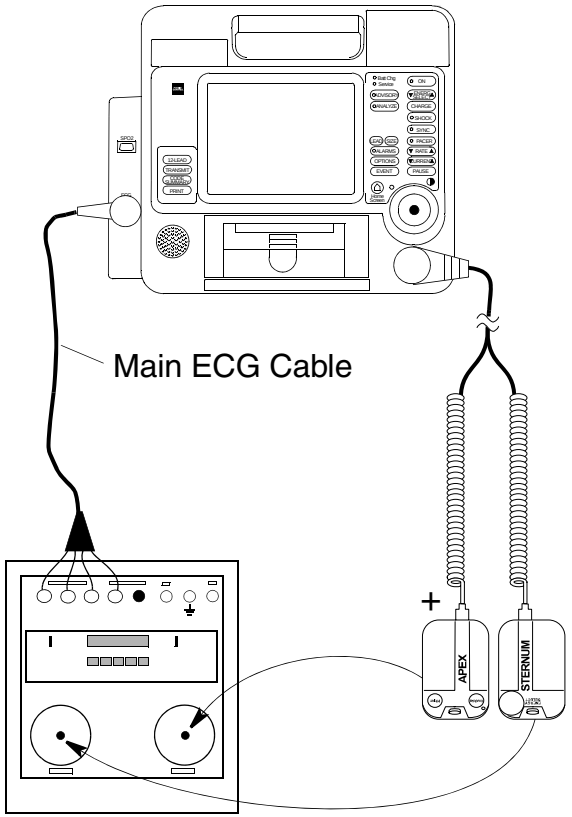
   Note: Perform the **TCP – Defibrillator Calibration** if the delivered energy falls outside of the acceptable output range.

6. Record the results on the **PIP Checklist**. **10**

7. Continue to next test, **PIP – Standard Paddles Synchronous Cardioversion**.

PIP – Instructions *(continued)*

PIP – Standard Paddles Synchronous Cardioversion



To test Synchronous Cardioversion using Standard Paddles:

Note: If the device does not have "sync in paddles" feature, skip this test. If using QUIK-COMBO electrodes, refer to **PIP – QUIK-COMBO Synchronous Cardioversion**.

WARNING!

Shock hazard. Electrical energy is discharged during this procedure. Do not allow the paddles to contact any person or conductive surfaces except as described below.

1. Connect the Main ECG Cable between the device and patient simulator.
2. Set the device ECG SIZE to 1.0. Select Lead II. Set the defibrillator analyzer to measure SYNC.
3. Press the SYNC control on the device. Make sure Lead II is selected. Verify the SYNC control LED turns on and R-wave markers appear on the ECG waveform.
4. Charge the device to 10 J. Upon reaching full charge, simultaneously press the paddles SHOCK switches to discharge the device. Verify the defibrillator analyzer measures a sync delay of 60 ms or less.
5. Record the results on the **PIP Checklist**. **11**
6. Continue to next test, **PIP – Standard Paddles ECG Characteristics**.

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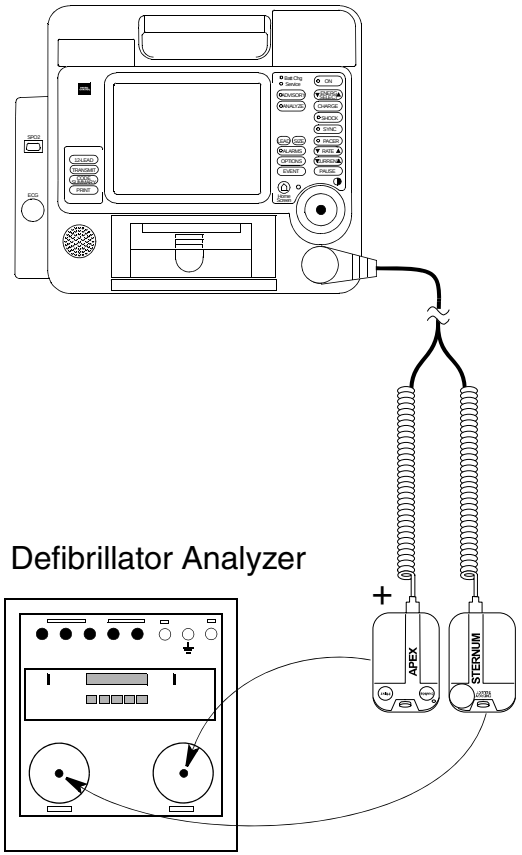
PIP – Instructions *(continued)*

PIP – Standard Paddles ECG Characteristics



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To test Paddles ECG gain:

1. Program the defibrillator analyzer output for a 1 mV, 10 Hz sine wave.
2. Set the device ECG SIZE to 4.0.
3. Set the device lead selection to PADDLES.
4. Place the paddles on the defibrillator analyzer test pads.
5. Record 10 seconds of PADDLES ECG and confirm the printed signal amplitude is 36 mm to 44 mm peak-to-peak.

   Note: BIO-TEK QED-6 produces a 1.1 mV output; confirm the printed signal amplitude is 38 mm to 50 mm peak-to-peak.
6. Record the results on the **PIP Checklist**. **12a**
7. Continue to the next page with this setup in place.

(Continued on next page)

PIP – Instructions *(continued)*

PIP – Standard Paddles ECG Characteristics (continued)

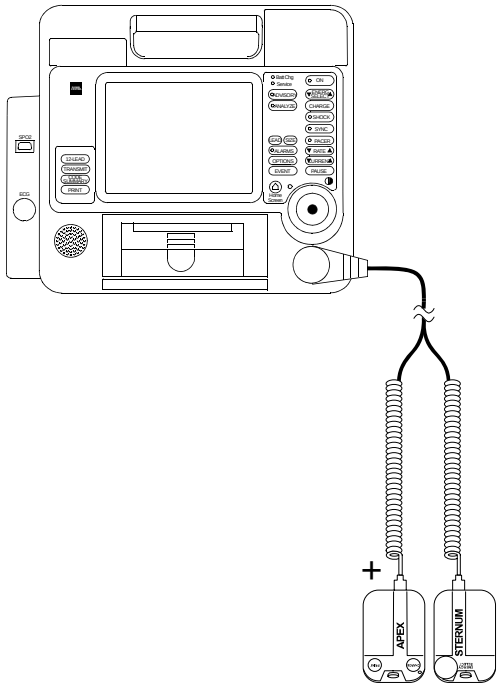
To test paddles ECG fast restore:

1. Program the defibrillator analyzer output for a 30 BPM, NSR.
2. Set the device ECG SIZE to 4.0.
3. Charge the device to 360 J.

   Note: Maintain contact between the defibrillator paddles and the defibrillator analyzer test load plates throughout this test.
4. Upon reaching full charge, press the PRINT control to begin recording.
5. Discharge the device into the defibrillator analyzer.
6. Allow the printer to run until the defibrillation event and associated ECG waveform finish printing.
7. Press the PRINT control to turn the printer off.
8. Note the ENERGY DELIVERED event mark and verify the ECG returns to the baseline in 0.5 seconds (12.5 mm) or less.
9. Record the results on the **PIP Checklist**. **12b**
10. Continue to next test, **PIP – Standard Paddles User Test**.

PIP – Instructions *(continued)*

Standard Paddles User Test



Note: Complete only if the device is equipped with the Hard Paddles option.

Optional for QUIK-COMBO device, **Skip to PIP - Advisory Mode Test**

Note: Use Customer's Standard Paddles (when available). Remove the paddles and check that the paddle surfaces and paddle wells are clean and dry and free of any debris. Also check therapy connector interface for pin damage.

WARNING!

Shock hazard. The Conductive gel (wet or dry) on the paddle handles and in the paddle wells may allow the electrical energy to arc between paddles during discharge. Thoroughly clean and dry the paddles and paddle wells after use and before performing the Standard Paddles User Test.

1. Replace the paddles in the paddle wells.
2. Turn on the device.
3. Select 10 J.
4. Press the CHARGE button on the Apex paddle.
5. Confirm the tone indicates full charge within 5 seconds.

(Continued on next page)

PIP – Instructions *(continued)*

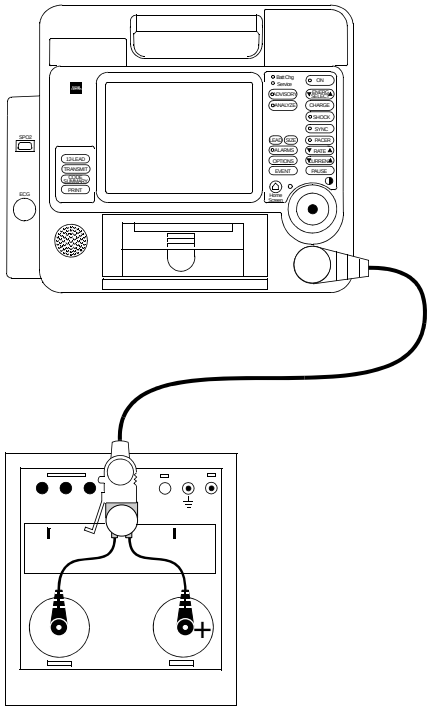
PIP – Standard Paddles User Test (continued)

6. Press only the APEX discharge button and confirm that the defibrillator does not discharge. Release the APEX discharge button.
7. Press only the STERNUM discharge button and confirm that the defibrillator does not discharge. Release the STERNUM discharge button.
8. With the paddles still in the paddle wells, press both discharge buttons simultaneously.
9. For a monophasic device, confirm ENERGY NOT DELIVERED message appears, indicating energy was removed internally.

   For a biphasic device, the message ABNORMAL ENERGY DELIVERED is displayed.
10. Record the results on the **PIP Checklist**. **13**
11. Continue to next test, **PIP - Advisory Mode Test**.

PIP – Instructions *(continued)*

PIP – Advisory Mode Test



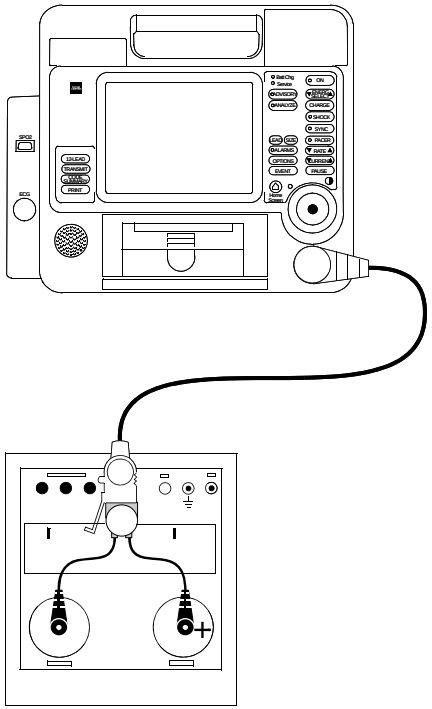
To perform the Advisory Mode Test:

Note: Conduct this test only if your device has an ADVISORY key on the A10 Large Keypad. If your device does not have an ADVISORY key, perform the **PIP – No Advisory Mode Option Test**.

1. Connect the device to the defibrillator analyzer using the QUIK-COMBO therapy cable and the QUIK-COMBO test post adapter.
2. Select Paddles lead.
3. Press the ADVISORY key on the device.
4. Verify the ADVISORY key LED lights and the ADVISORY MODE - MONITORING message appears on the display screen.
5. Press the ADVISORY key on the device again to exit advisory mode.
6. Record the results on the **PIP Checklist**. **14**
7. Depending upon the configuration of the device, continue to test, **PIP – Pacer Option Characteristics** or **PIP – No Pacer Option Characteristics**.

PIP – Instructions *(continued)*

PIP – No Advisory Mode Test



To perform the No Advisory Mode Test:

Note: Conduct this test only if your device does not have an ADVISORY key on the A10 Large Keypad. If your device does have an ADVISORY key, perform the **PIP – Advisory Mode Test**.

The device must be set up for AED/DIRECT mode when performing the No Advisory Mode Test. Use the following procedure to temporarily set the device to AED/DIRECT mode.

1. Enter the **setup** mode.
2. Select the MANUAL MODE… menu option.
3. Select the MANUAL ACCESS option from the MANUAL MODE… submenu.
4. Note the manual access choice currently selected (for example, MANUAL/DIRECT, AED/CONFIRM ONCE, AED/RESTRICTED, and so forth) on the **PIP Checklist**. **15**
5. Select AED/DIRECT.
6. Turn off the device and continue to the next page.

(Continued on next page)

PIP – Instructions *(continued)*

PIP – No Advisory Mode Test (continued)

To perform the No Advisory Mode Test:

1. Connect the device to the defibrillator analyzer using the QUIK-COMBO therapy cable and the QUIK-COMBO test post adapter.
2. Turn on the device.
3. Select Paddles lead.
4. Verify the ADVISORY MODE - MONITORING message does NOT appear on the display screen.
5. Record the results on the **PIP Checklist**. **15**

To restore the device manual mode access:

1. Enter the **setup** mode.
2. Select the MANUAL MODE… menu option.
3. Select the MANUAL ACCESS option from the MANUAL MODE… submenu.
4. Select the manual access option recorded on the PIP checklist.

(Continued on next page)

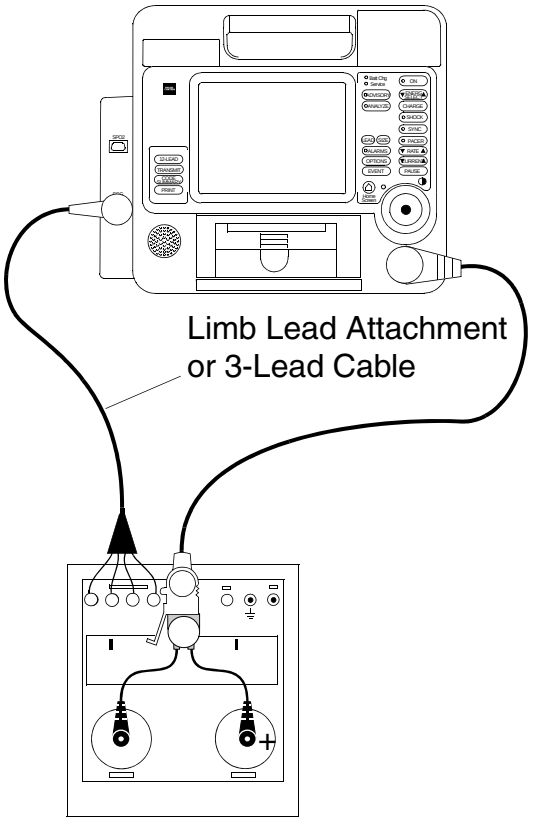
PIP – Instructions *(continued)*

PIP – No Advisory Mode Test (continued)

5. Cycle power on the device. Verify that the device powers up in the appropriate mode (manual or advisory).
6. Depending upon the configuration of the device, continue to test, **PIP – Pacer Option Characteristics** or **PIP – No Pacer Option Characteristics**.

PIP – Instructions *(continued)*

PIP – Pacer Option Characteristics



To test Pacer Leads Off Detection:

Note: Conduct this test only if your device has a PACER control on the A10 Large Keypad. If your device does not have a PACER control, perform the **PIP – No Pacer Option Characteristic** test.

1. Set the defibrillator analyzer to measure peak current pacing parameters.
2. Press the PACER control on the device.
3. Verify the PACER control LED lights and the PACER overlay appears.
4. Disconnect one of the Test Post Adapter snaps from the defibrillator analyzer.
5. Verify the PACING/CONNECT ELECTRODES overlay appears accompanied by an audible alarm.
6. Reconnect the Test Post Adapter snap. Verify the PACING/CONNECT ELECTRODES overlay disappears and the alarm stops.
7. Record the results on the **PIP Checklist**. **16a**
8. Continue to the next page with this setup in place.

(Continued on next page)

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PIP – Instructions *(continued)*

PIP – Pacer Option Characteristics (continued)

To test the Pacer Output Current:

1. Press the device CURRENT control to select a pacer current of 10 mA.
2. Verify the defibrillator analyzer indicates the pacer output current is within the acceptable output limits, shown below.
3. In this manner, check the peak pacer current for the following settings:

Peak Current Level (mA)	Acceptable Output (mA)
10	5 to 15
100	95 to 105
200	190 to 210

Note: Perform the **TCP – Pacing Self Calibration** if the peak pacer current falls outside of the acceptable output range.

4. Record the results on the **PIP Checklist**. **16b**
5. Continue to the next page with this setup in place.

(Continued on next page)

PIP – Instructions *(continued)*

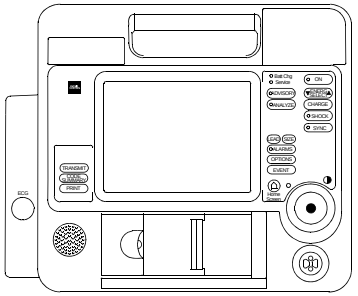
PIP – Pacer Option Characteristics (continued)

To test the Pacer Pulse Width:

1. Press the device CURRENT control to select a pacer current of 200 ma.
2. Verify the defibrillator analyzer indicates the pacer pulse width is between 19.0 and 21.0 ms.
3. Press the device PACER control to terminate pacing.
4. Record the results on the **PIP Checklist**. **16c**
5. Continue to the next test, **PIP – Impedance Sense**.

PIP – Instructions *(continued)*

PIP – No Pacer Option Characteristic



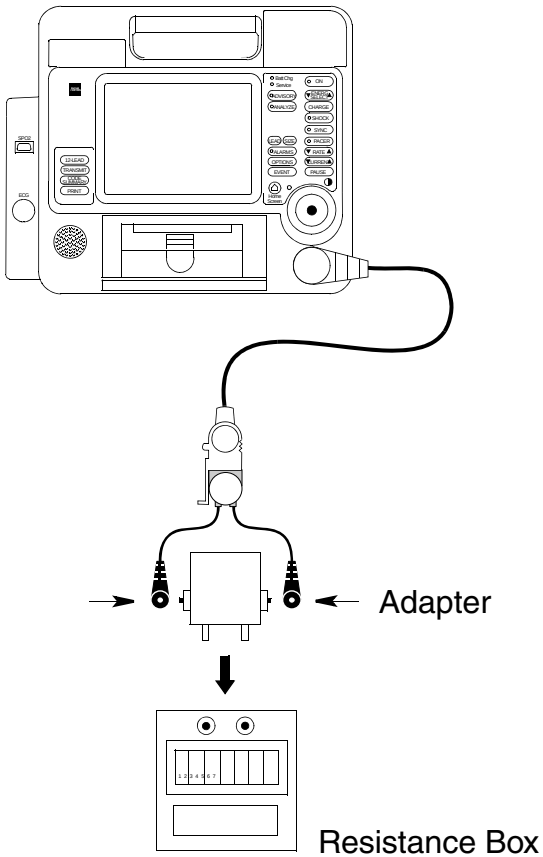
To test the No Pacer option characteristic:

Note: Conduct this test only if the device does not have a PACER control on the A10 Large Keypad. If the device has a PACER control, perform the **PIP – Pacer Option Characteristics** test.

1. Disconnect all cables from the device.
2. Perform the **TCP – Pacing Self Calibration**. It is not necessary to perform the Pacing Verification portion of the TCP – Pacing Self Calibration test.
3. After calibration (nominal 1 minute), the message CALIBRATION COMPLETE indicates a successful test.
4. Turn off the device.
5. Record the results on the **PIP Checklist**. **17**
6. Continue to the next test, **PIP – Impedance Sense**.

PIP – Instructions *(continued)*

Impedance Sense



To test Impedance Sense circuitry:

1. Connect the QUIK-COMBO Test Post snaps to a decade resistance box, using whatever adapter is appropriate to make connections.
2. Place the device into manual mode (ADVISORY off).
3. Set the device lead selection to PADDLES.
4. Set the decade resistance box to 370 Ω.
5. Verify the device displays the PADDLES LEADS OFF message.
6. Record the results on the **PIP Checklist**. **18a**
7. Set the decade resistance box to 238 Ω.
8. Verify the PADDLES LEADS OFF message is removed from the device display.
9. Record the results on the **PIP Checklist**. **18b**
10. Remove the decade resistance box.
11. Continue to the next test, **PIP – ECG Analog Output**.

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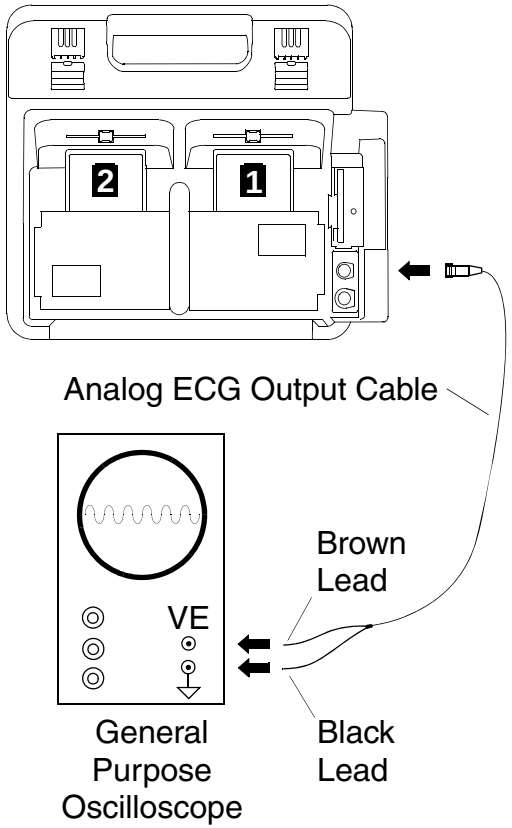
PIP – Instructions *(continued)*

PIP – ECG Analog Output (Optional Test)



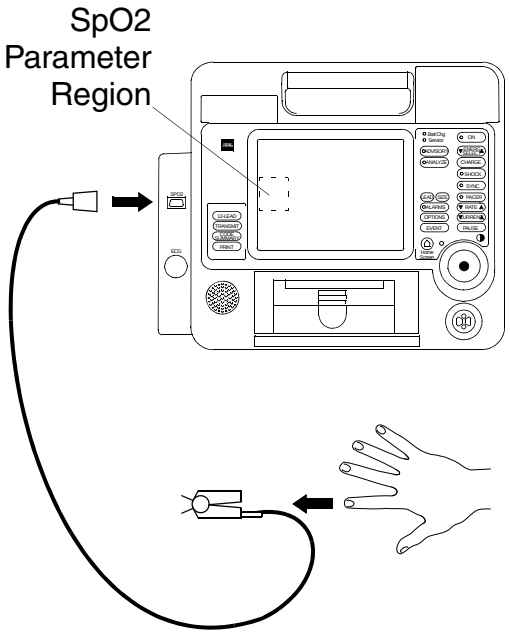
To test the ECG analog output:

Note: This test is optional. Perform if this feature is used. **Skip to Next Test**.

1. Establish the test setup as shown at the left.
2. Using the ECG cable supplied with the device, input a 1 mV 10 Hz sine wave from the patient simulator.
3. Set the device lead selection to LEAD II. (The ECG analog output is in real time at a nominal 1 V/mV and is not affected by the device ECG size setting.)
4. Verify the amplitude of the signal displayed on the oscilloscope is between 0.85 Vp-p and 1.15 Vp-p.
5. Record the results on the **PIP Checklist**. **19**
6. Disconnect the Analog ECG Output Cable from the device and oscilloscope.
7. Continue to the next test, **PIP – Spo2 Oximeter** test.

PIP – Instructions *(continued)*

PIP – SpO2 Oximeter



Note: Complete only if the device is equipped with the SpO2 Oximeter option. **Skip to Next Test**.

To test the SpO2 Oximeter:

1. Connect the Oximeter finger probe to the SpO2 connector.
2. Verify the SpO2 parameter region appears on the display.
3. Place your index finger into the SpO2 probe. Allow several seconds for the probe to find your pulse. Confirm the SpO2 reading is between 90% and 100%.
4. Disconnect the SpO2 probe.
5. Turn off the device.
6. Record the results on the **PIP Checklist**. **20**
7. Continue to the next test, **PIP – EtCO2 Verification** test.

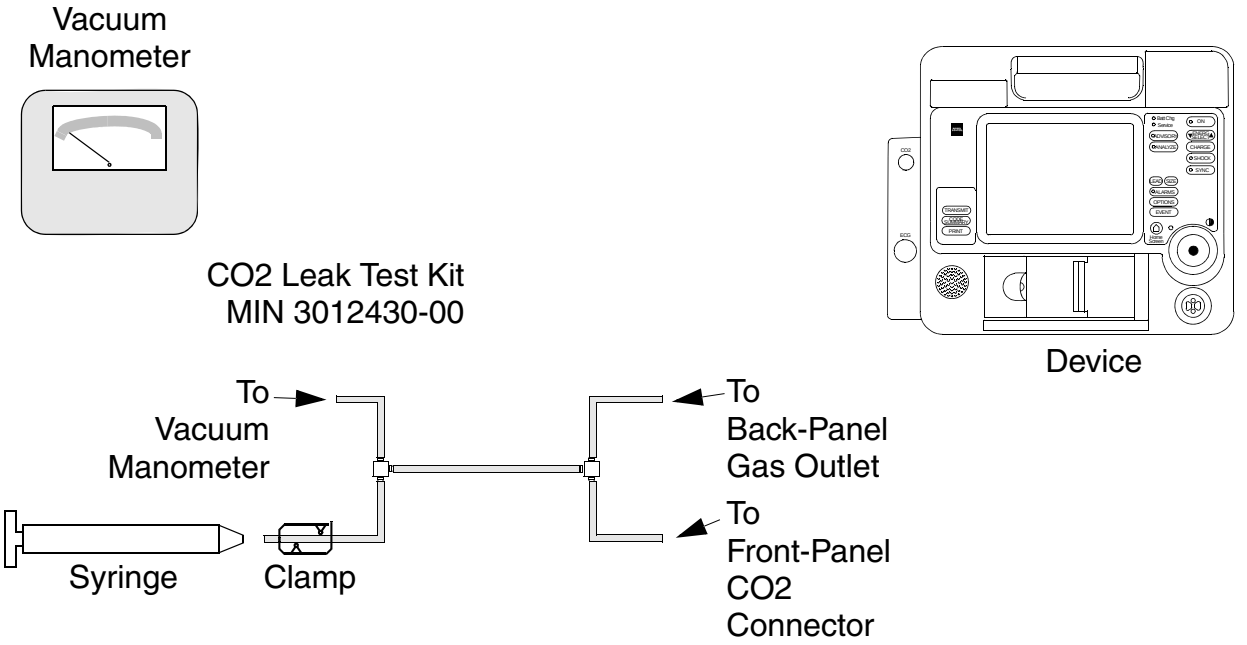
PIP – Instructions *(continued)*

PIP – EtCO2 Verification

Note: Complete only if the device is equipped with the EtCO2 option. **Skip to Next Test**.

To test the EtCO2 Monitor for leaks:

1. Set up the test equipment as shown in the diagram below.



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PIP – Instructions *(continued)*

PIP – EtCO2 Verification (continued)

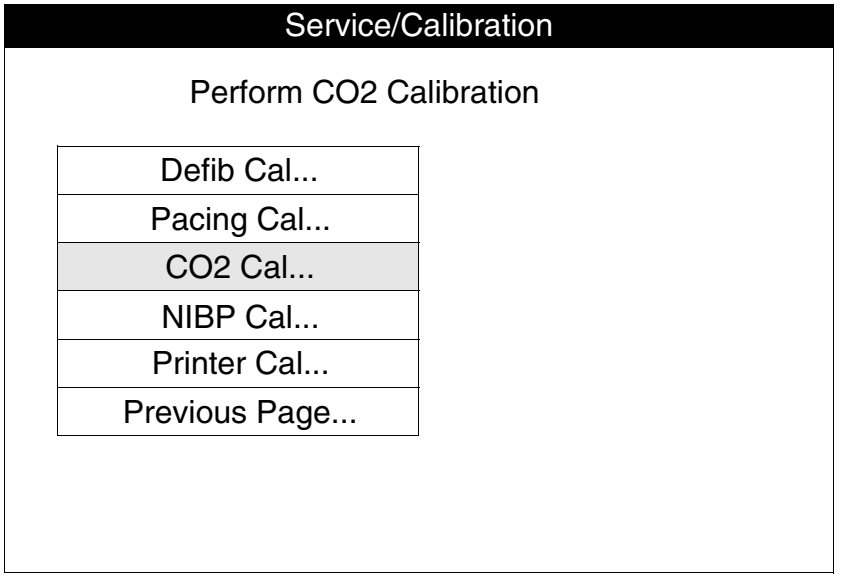
2. Turn the LIFEPAK 12 defibrillator/monitor power OFF. Disconnect the tubing from the front panel CO2 connector.
3. Open the hose clamp and depress the syringe fully.
4. Connect the tubing to the front panel CO2 connector and to the back panel CO2 gas outlet. (**Important:** Press the fittings that connect to the LIFEPAK 12 firmly on to avoid leakage. All tubing ends should now be connected as shown in the diagram on the previous page.)
5. Pull the syringe plunger out to induce vacuum into the system. When the vacuum manometer indicates approximately –300 mBars (–230 mmHg), close the tubing clamp firmly.
6. Begin timing as the clamp is closed. Verify that after 30 seconds, the change in vacuum reading is less than 20 mBars (15 mmHg).
7. Open the tubing connection to the front panel CO2 connector to release the vacuum.
8. Record the result on the **PIP Checklist**. **21a**

PIP – Instructions *(continued)*

PIP – EtCO2 Calibration Check

To perform EtCO2 calibration check:

1. Select CALIBRATION from the SERVICE menu to display the SERVICE/CALIBRATION submenu.
2. Select CO2 CAL. . . .



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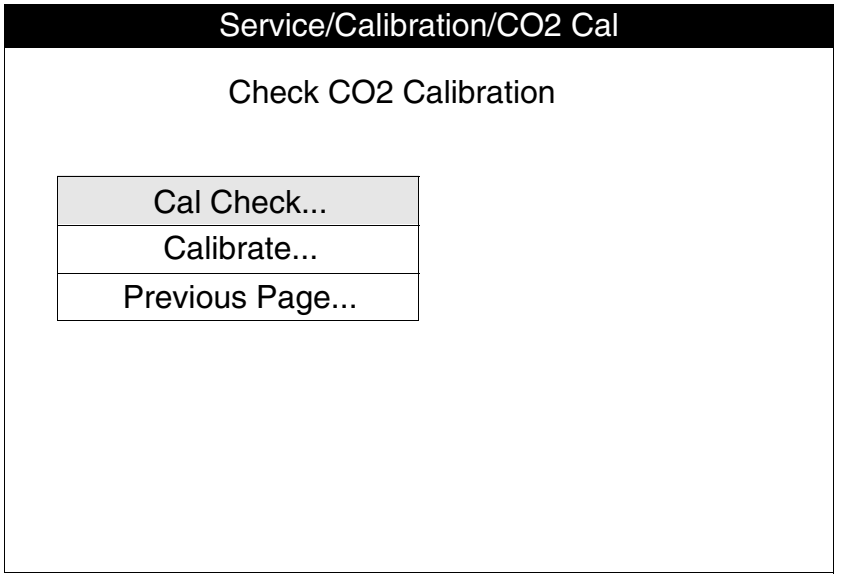
PIP – Instructions *(continued)*

PIP – EtCO2 Calibration Check (continued)

3. Select CAL CHECK. . . .



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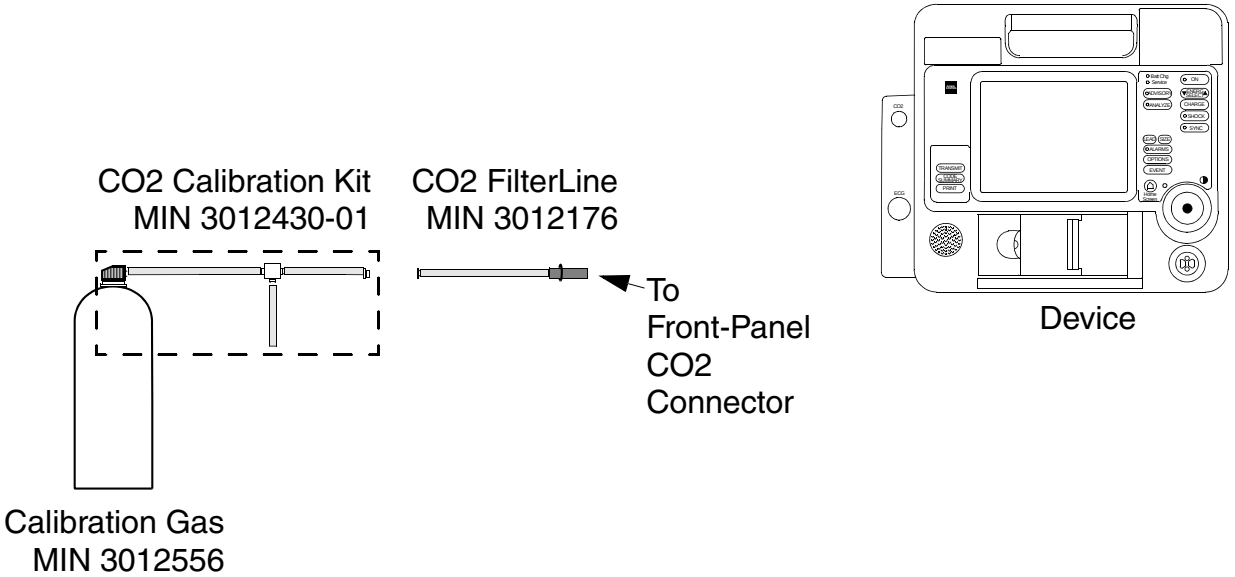
PIP – Instructions *(continued)*

PIP – EtCO2 Calibration Check (continued)

To connect calibration gas:

Connect the calibration gas canister to the front panel CO2 connector using a standard CO2 FilterLine™ and the CO2 calibration kit.



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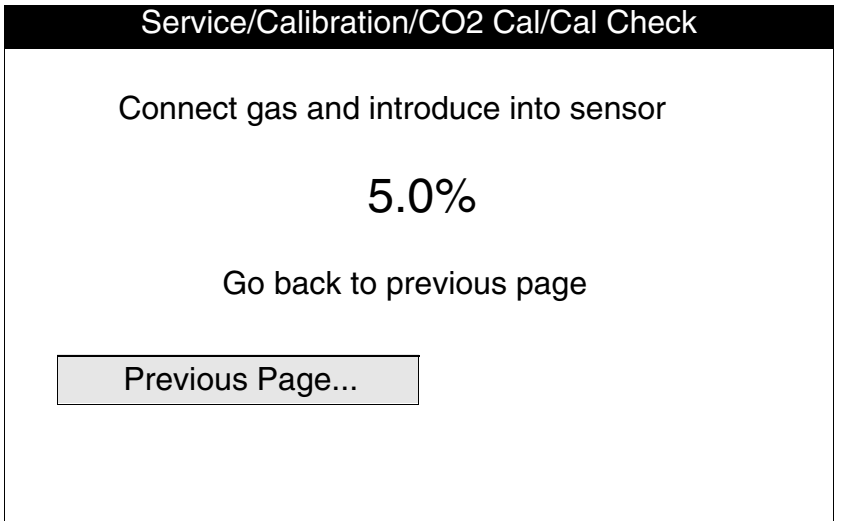
PIP – Instructions *(continued)*

PIP – EtCO2 Calibration Check (continued)

To check calibration:

1. Press and hold the spray nozzle to apply the calibration gas. Release the spray nozzle when the device displays a stable value for the measured CO2 content of the calibration gas.
2. Verify that the measured gas concentration reads 5.0% ±0.5%. Record the result on the **PIP Checklist.** **21b**

   If the measured value is incorrect, refer to **TCP – EtCO2 Calibration**.



3. Select PREVIOUS PAGE. . . (twice) to return to the SERVICE/CALIBRATION submenu. (Continue to next test, **PIP - NIBP Verification**.)

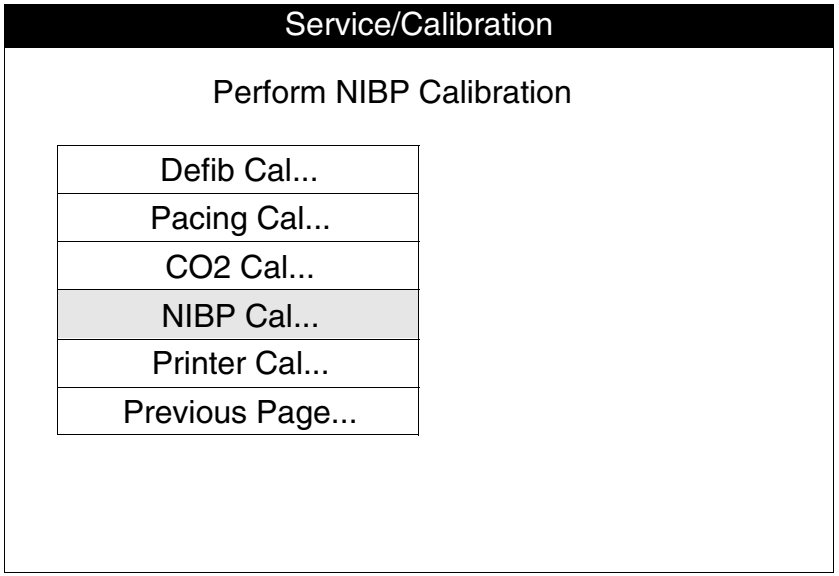
PIP – Instructions *(continued)*

PIP – NIBP Verification

Note: Complete only if the device is equipped with the NIBP option. **Skip to Next Test**.

To perform NIBP calibration check:

1. Select CALIBRATION from the SERVICE menu to display the SERVICE/CALIBRATION submenu.
2. Select NIBP CAL . . . .



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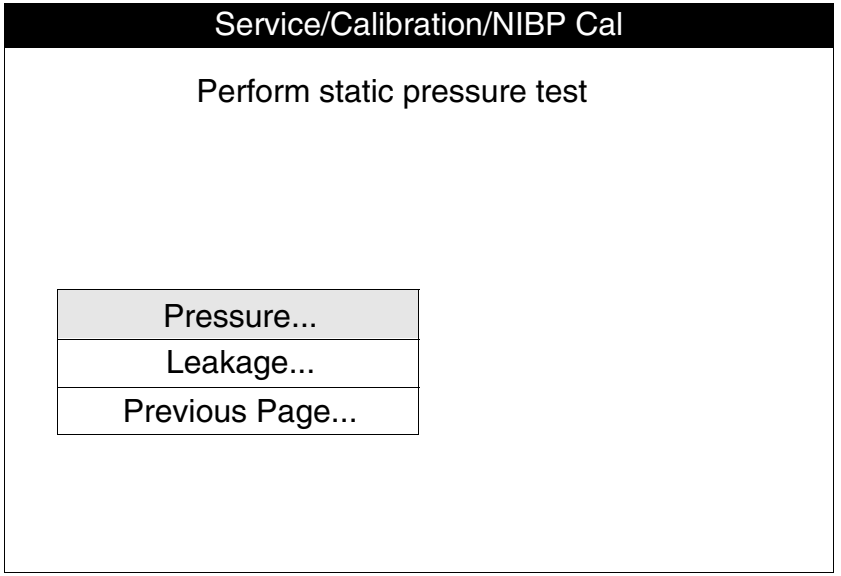
PIP – Instructions *(continued)*

PIP – NIBP Verification (continued)

To perform static pressure check:

Select PRESSURE . . . from the SERVICE/CALIBRATION/NIBP CAL submenu.



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PIP – Instructions *(continued)*

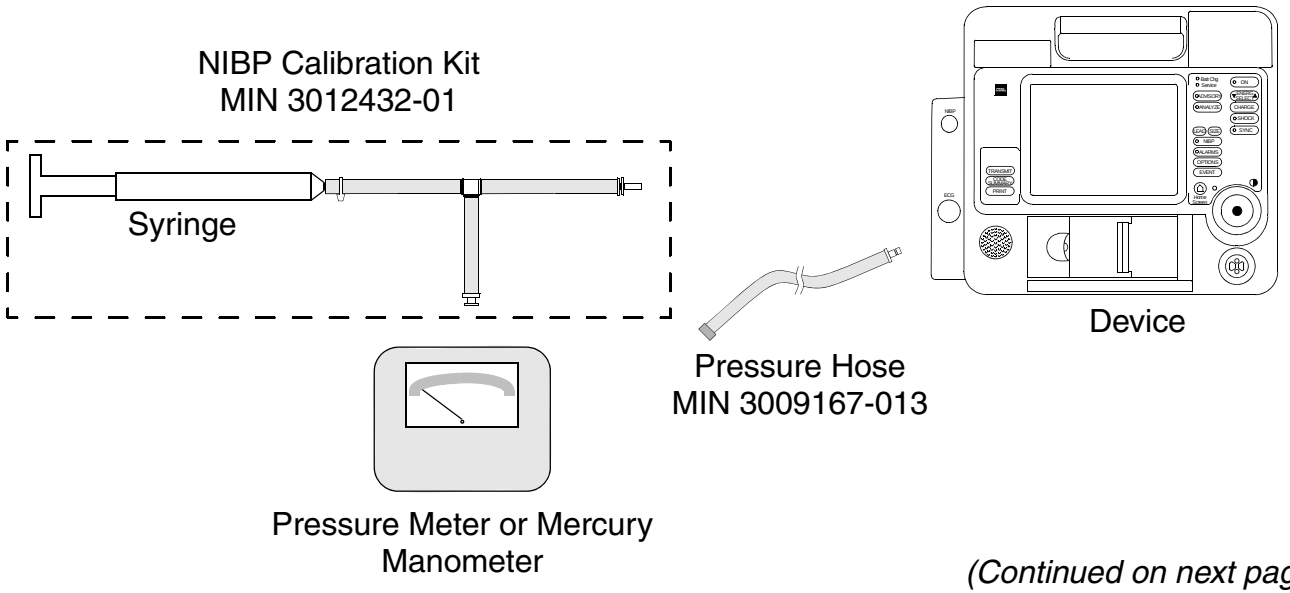
PIP – NIBP Verification (continued)

To perform static pressure check:

1. Set up the NIBP calibration kit as shown in the diagram below.

CAUTION!

Possible equipment damage. Pulling out on the syringe plunger applies a vacuum to the NIBP connection and may damage the LIFEPAK 12 defibrillator/monitor. DO NOT pull on the plunger. Only push in on the plunger to inflate the system per the following instructions.



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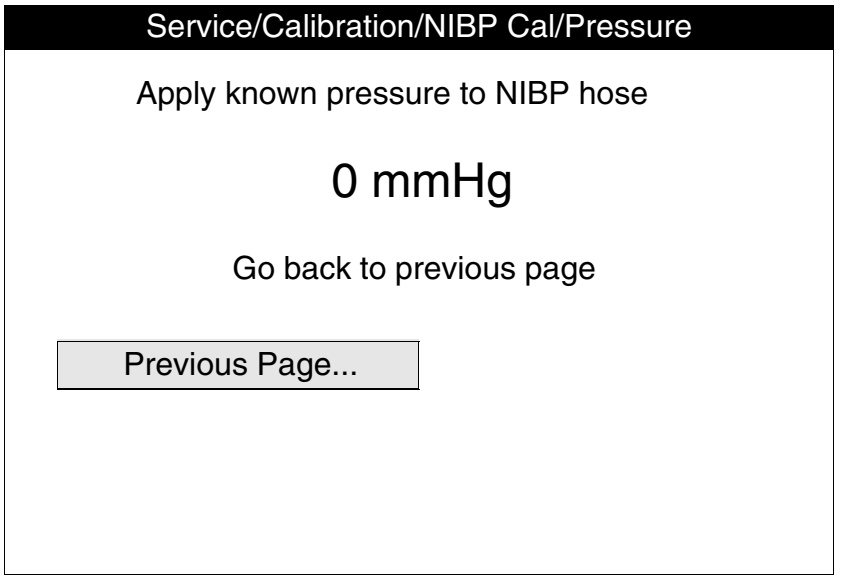
PIP – Instructions *(continued)*

PIP – NIBP Verification (continued)

2. Adjust the pressure meter if necessary to a zero initial pressure to ensure that the device and the pressure meter agree.



3. Using the syringe, inflate the system to each of the following pressures (as indicated on the manometer or pressure meter):

- 50 mmHg
- 100 mmHg
- 150 mmHg
- 200 mmHg

(Continued on next page)

PIP – Instructions *(continued)*

PIP – NIBP Verification (continued)

4. Verify that the display of the device and the external pressure meter agree within ±3 mmHg. Record the result on the **PIP Checklist.** **22a**
5. Using the syringe, **slowly** inflate the system until the overpressure switch activates at 285 mmHg ±10 mmHg. Record the result on the **PIP Checklist.** **22b**
6. Verify that the system depressurizes, and that the light on the NIBP key goes out. The pressure reading at which the overpressure fault occurred remains displayed on the device.
7. Select PREVIOUS PAGE....

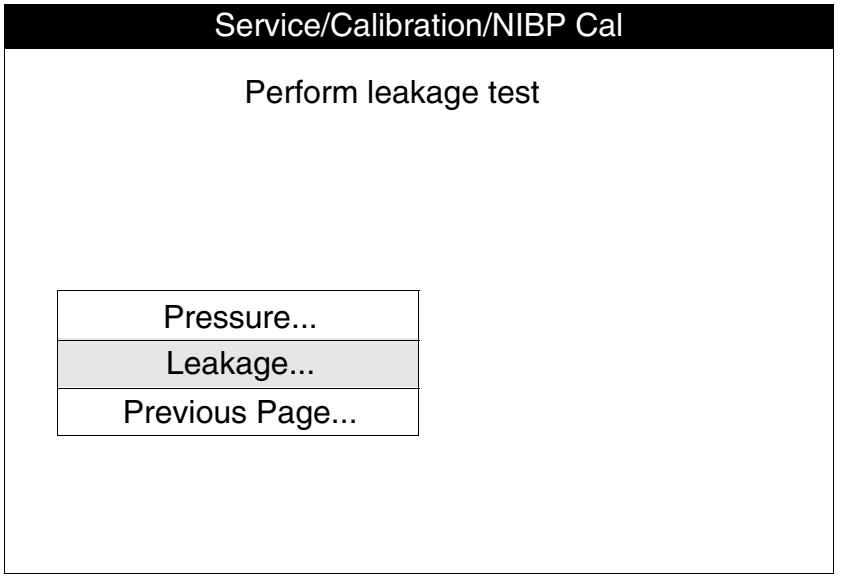
(Continued on next page)

PIP – Instructions *(continued)*

PIP – NIBP Verification (continued)

To check the NIBP Monitor system for leaks:

1. Select LEAKAGE . . . from the SERVICE/CALIBRATION/NIBP CAL submenu.



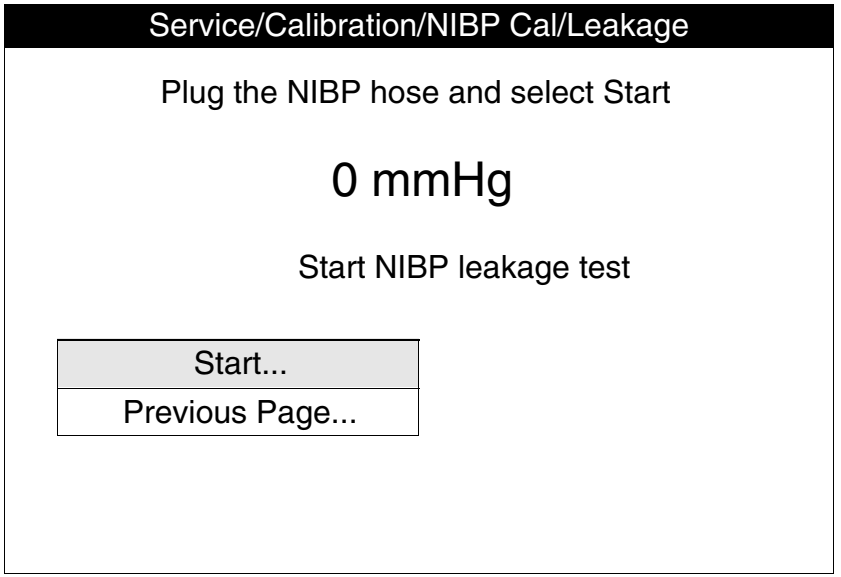
2. Connect a length of NIBP tubing to the NIBP connector.
3. Occlude the distal end of the NIBP tube by plugging it or folding it double and pinching it.

(Continued on next page)

PIP – Instructions *(continued)*

PIP – NIBP Verification (continued)

4. Select START..... The device pressurizes the tubing to approximately 200 mmHg. Verify that the message LEAKAGE TEST OK appears.



5. Record the results on the **PIP Checklist**. **22c**
6. Turn the device off, then on to exit the service mode.
7. Continue to the next test, **PIP – Invasive Pressure Verification** test.

PIP – Instructions *(continued)*

PIP – Invasive Pressure Verification

Note: Complete only if the device is equipped with the Invasive Pressure option. **Skip to Next Test**.

1. Turn the device ON.
2. Use the invasive pressure cable to connect the invasive pressure simulator (DNI Nevada 217A or equivalent) to the P1 connector on the parameter bezel.
3. Turn the simulator ON.
4. Set the simulator pressure output to range of 160 to 200 mmHg.
5. Turn the Selector to highlight CHANNEL 2 in the Wave Form Area of the display.
6. Click the Selector, and click again on WAVEFORM. Select and click P1 to display the pressure waveform.
7. On the CHANNEL 2 overlay, verify that the scale is set to AUTOSCALE. Select and click ZERO to zero the P1 pressure channel.

   Record the result on the **PIP Checklist** **23a&d**
8. Set the invasive pressure simulator to output static pressures.
9. Select 250 mmHg. Verify that the Mean Arterial Pressure (MAP) display and the pressure waveform read 250 ±9 mmHg within a few seconds.

(Continued on next page)

PIP – Instructions *(continued)*

PIP – Invasive Pressure Verification (continued)

10. Repeat step 9 above, using the following simulated pressures:
    - 200 mmHg (±8 mmHg)
    - 100 mmHg (±6 mmHg)
    - 40 mmHg (±5 mmHg)
    - 20 mmHg (±4 mmHg) Record the result on the **PIP Checklist** **23b&e**
11. With a simulated pressure input of 20 mmHg, turn the Selector to highlight CHANNEL 2 in the Waveform Area of the display, and ZERO the P1 pressure channel again. Verify that the pressure waveform and the MAP display return to the zero.
12. Set the simulator pressure output to zero. Highlight CHANNEL 2, select and click AUTOSCALE again. Press the HOME SCREEN key.
13. Verify that the LIFEPAK 12 displays –20 ±4 mmHg within a few seconds. Record the results on the **PIP Checklist**. **23c&f**
14. Disconnect the invasive pressure cable from the P1 connector and connect it to P2.
15. Select CHANNEL 2, and then assign P2 to the display.
16. Repeat steps 5 through 13 above for the P2 Pressure Channel.
17. Continue to the next test, **PIP - PC Card**.

PIP – Instructions *(continued)*

PIP – PC Card (Optional test)

This test checks the ability of the internal PC Card to connect with a remote landline modem. This procedure assumes you are using a suggested PC Card modem, MIN 3010294, or equivalent.

Note: Complete only if the device is equipped with the a **Modem PC Card** option. **Skip to Next Test**.

Note: For additional PC Card testing, refer to **Troubleshooting — PC Card Test**.

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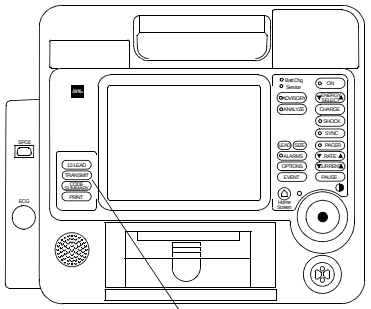
PIP – Instructions *(continued)*

PIP – PC Card (continued)



To test PC Card communications:

1. Hold down the OPTIONS and EVENT controls and turn on the device. Hold until the PASSCODE overlay appears. Enter the setup mode passcode **5433**.
2. Rotate the Selector to TRANSMISSION and press.
3. If the device has the Fax option, rotate the Selector to DATA and press.
4. Use the Selector to navigate to PORTS, then INTERNAL, then EDIT STRING 1. Enter the string AT, choosing END as the last character. Press HOME SCREEN.
5. Rotate the Selector to TRANSMISSION and press.
6. If the device has the Fax option, rotate the Selector to DATA and press.
7. Use the Selector to navigate to SITES, SITE 10 (or any unconfigured site). For NAME, enter PIPTEST choosing END as the last character; for PHONE #, enter 11, choosing END as the last character; for OUTPUT PORT, select INTERNAL. Press HOME SCREEN.
8. Turn the device off and then on again.
9. Press the TRANSMIT key.
10. If the device has the Fax option, rotate the Selector to DATA and press.

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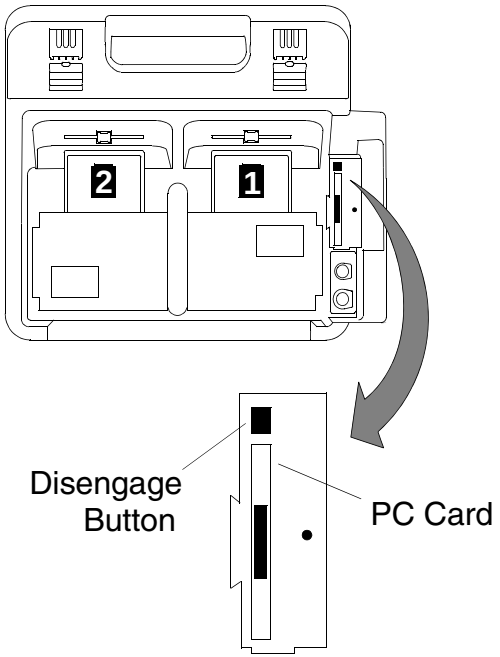
PIP – Instructions *(continued)*

PIP – PC Card (continued)



Removing the PC Card

11. Use the Selector to select PIPTEST for the SITE, and then select SEND and press the Selector.
12. Observe the message area at the bottom of the screen. The message DIALING indicates a successful test.
13. Record the results on the **PIP checklist**. **24**

To remove the PC Card from the device:

1. Turn off the device.
2. Press the disengage button just above the PC Card to push the card free of the connector. Remove the PC Card.
3. Reinstall the PC Card cover.
4. Continue to the next test, **PIP - LIFENET BLUE**.

PIP – Instructions *(continued)*

PIP – LIFENET BLUE

Equipment Required:

Note: Complete only if the device is equipped with the LIFENET BLUE Wireless option. **Skip to Next Test**.

PC/Laptop with CODE-STAT Suite 5.0 (min.) installed (refer to the CODE-STAT Suite installation instructions), and equipped with LIFENET BLUE wireless communications (refer to the TDK installation instructions).

LIFEPAK 12 equipped with the LIFENET BLUE Wireless option

1. Set up CODE-STAT Suite and enable the communications to accept a transmission from the LIFEPAK 12. (Refer to “CONFIGURING THE COMPUTER” in the LIFENET BLUE Reference Guide for details.) Verify that the “Auto Import” is turned on.

2. Set up a wireless data transmission site in the LIFEPAK 12. (Refer to “Configuring the Defibrillator” in the LIFENET BLUE Reference Guide for details.) Pair the LIFEPAK 12 with PC/Laptop. (Refer to “Pairing Wireless Devices” in the LIFENET BLUE Reference Guide for details.)

   Note: You can find the PC/Laptop name by selecting My Bluetooth Places Advanced Configuration in the Bluetooth menu. Select the General tab.

(Continued on next page)

PIP – Instructions *(continued)*

PIP – LIFENET BLUE (continued)

3. In the LIFEPAK 12, create a new episode and transmit that episode to the wireless site in the PC/Laptop in step 1.
4. Once the LIFEPAK 12 has identified the wireless site and transmitted to it, open up the CODE-STAT Reviewer and verify that the episode has been pushed into the CODE-STAT Database.
5. Record the results on the LIFEPAK 12 Defibrillator/Monitor PIP Checklist.
6. Remove the test wireless data transmission site set up in step 2.
7. Record the results on the **PIP checklist**. **25**
8. Continue to the next test, **PIP - Voice Recorder Accessory test**.

PIP – Instructions *(continued)*

PIP – Voice Recorder Accessory

Note: Complete only if the device is equipped with the **Voice Recorder Accessory** option. **Skip to Next Test**.

1. Inspect the voice recorder exterior for damage and loose connections.
2. Verify that the device is firmly attached to the LIFEPAK 12 defibrillator/monitor.
3. Connect the USB cable to the service laptop computer, but ***DO NOT*** connect it to the Voice Recorder Module yet.
4. Turn the LIFEPAK 12 defibrillator/monitor **ON**, and note the time displayed.
5. Wait a minimum of 5 seconds and then speak the following message: "***This is a performance test of the voice recorder accessory at (customer site). This test is being performed to verify that the voice recorder is capable of acquiring and storing audio data.***
6. Wait approximately 3 seconds and then turn the LIFEPAK 12 defibrillator/monitor **OFF**.

(Continued on next page)

PIP – Instructions *(continued)*

PIP – Voice Recorder Accessory (continued)

7. Connect the USB cable to the Voice Recorder Module. After a few seconds, the Voice Recorder icon in the **Voice Recorder Import Manager** window will turn green, and the message "**Retrieving device directory**" will be displayed in the lower-left corner of the window.

8. When the displayed message in the lower-left corner of window changes to "**Device directory done**," the "**Phaser Device List**" window will appear, with a list of files displayed.

9. Select (check the check box) the file with a date and time stamp that is closest to the time you noted during recording of your audio sample. Click **OK**. The file will be downloaded to the **Voice Recorder Import Manager** screen.

10. Verify that the file downloaded has a date and time stamp that is close to the date and time you noted during recording. For example a file started on November 28, 2000, at 10:30:27 in the morning should have a file name similar to: 20001128103027 00xxxx) where "xxxx" corresponds to the serial number of the LIFEPAK 12 defibrillator/monitor.

11. Verify that the most recent file downloaded has the **.LAO** extension. You may have to resize the window to see the extension.

(Continued on next page)

PIP – Instructions *(continued)*

PIP – Voice Recorder Accessory (continued)

12. Click the file to select it and then click the "**PLAY**" button on the right side of the **Voice Recorder Import Manager** window.
13. Verify that the file replays what you spoke into the Voice Recorder during step 3 of this procedure.
14. Remove the file from the **Voice Recorder Import Manager** window by selecting it (if not currently selected) and clicking the "**TRASH**" button in the lower left corner of the **Voice Recorder Import Manager** window.
15. Disconnect the voice recorder from the service laptop computer and close the "**Unsafe Removal of Device**" window by clicking **OK**.
16. Record the results on the LIFEPAK 12 Defibrillator/Monitor **PIP Checklist**. **26**

This completes the voice recorder accessory Performance Inspection Procedure.

17. Continue to the next test, **PIP - LIFEPAK 12 Maintenance Instruction**.

PIP – Instructions *(continued)*

PIP – LIFEPAK 12 Maintenance Instruction

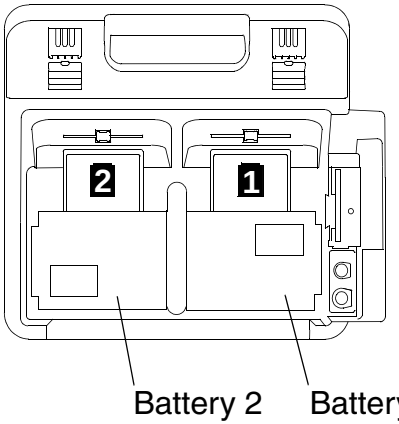
Disabling or Resetting the Maintenance Due Indicator

1. Enter the service mode (refer to **Modes of Operation**).
2. Select the MAINT PROMPT… menu option.
3. Select INTERVAL, and choose OFF to disable the maintenance prompt. If a maintenance prompt is desired, Select INTERVAL, and make the appropriate selection. The maintenance interval timer resets to the selected interval.
4. Turn the device off.
5. Record all results on the **PIP Checklist**. **27**
6. Continue to the next test, **PIP - Battery Power Source Management**.

Note: The device is powered by FASTPAK, FASTPAK 2, LIFEPAK NiCd and LIFEPAK SLA batteries. When the LIFEPAK12 Battery Contact PCB P/N 3006394 is replaced, perform battery switching test with LIFEPAK NiCd P/N 3009376.

PIP – Instructions *(continued)*

PIP – Battery Power Source Management

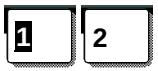


To test battery switching:

1. Install two charged batteries. Turn on the device.

   Note: Battery indications may look slightly different.

2. Notice the two battery icons at the top of the display, with the device powered by Battery 1.

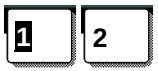
3. Remove Battery 1. Verify the Battery 1 icon disappears and the device remains powered by Battery 2.

4. Reinsert Battery 1 and remove Battery 2. Verify the Battery 2 icon disappears and the device remains powered by Battery 1.

5. Reinsert Battery 2. Verify both battery icons appear.

(Continued on next page)

PIP – Instructions *(continued)*

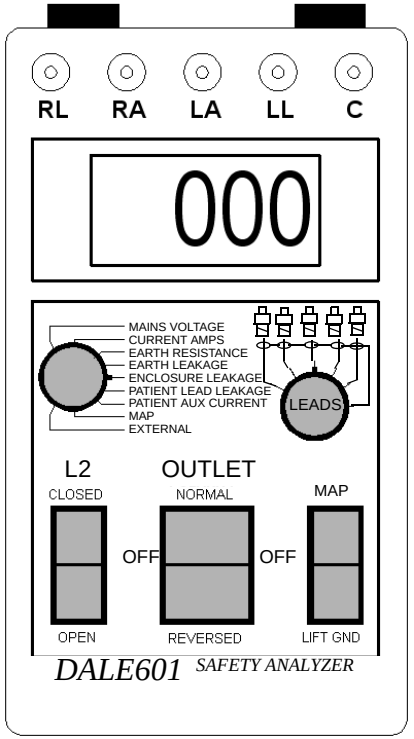
PIP – Battery Power Source Management (continued)

6. Record the results on the **PIP Checklist**. **28**
7. Turn off the device. Continue to **Leakage Test.**

(Continued on next page)

PIP – Instructions *(continued)*

PIP – Leakage Current



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Check the leakage current in accordance with the following industry standards:

- AAMI/ANSI (Association for the Advancement of Medical Instrumentation/ American National Standards Institute) DF2-1989, DF39-1993
- IEC (International Electrotechnical Commission) 601-1 and 601-2-4

WARNING!

Shock Hazard. Failure to properly perform these tests could result in a failure to detect excessive leakage current. Make sure you are familiar with your test equipment and these test performance procedures.

Leakage Current flow induced by the application of high voltage to a material or object with high dielectric strength.

Earth Ground Third wire ground

Normal Condition (N.C.) AC voltage is applied in either normal or reversed polarity, that is, measurements made with the POLARITY switch in both NORMAL and REVERSED positions. The earth ground is intact during these measurements (if LIFT GND switch is not pressed).

Single Fault Condition (S.F.C.) AC voltage is applied in either normal or reversed polarity, that is, measurements made with the POLARITY switch in both NORMAL and REVERSED positions. The earth ground is **NOT** intact during these measurements (if LIFT GND switch is pressed).

(Continued on next page)

PIP – Instructions *(continued)*

PIP – Leakage Current (continued)

Note: Due to the variety of safety analyzers that may be used for these tests, this service manual provides only general instructions. For information about configuration and testing methods, refer to your safety analyzer operating instructions.

Each test result applies to a safety analyzer operating from a 120 vac source or 240 vac source, unless indicated otherwise. For exceptions, the test result includes the safety analyzer operating source. For example, 300 µA (120 vac) or 500 µA (240 vac). All test results are summarized in the **Leakage Current Specifications Summary Table**.

Proceed to the **next page**.

(Continued on next page)

PIP – Instructions *(continued)*

Device Battery or Power Adapter Leakage Testing

If device normal operation is battery power (no AC power adapter), go to the next section: **Battery Operated Device.**

Note: If DC-PA is connected, perform battery-operated device test.

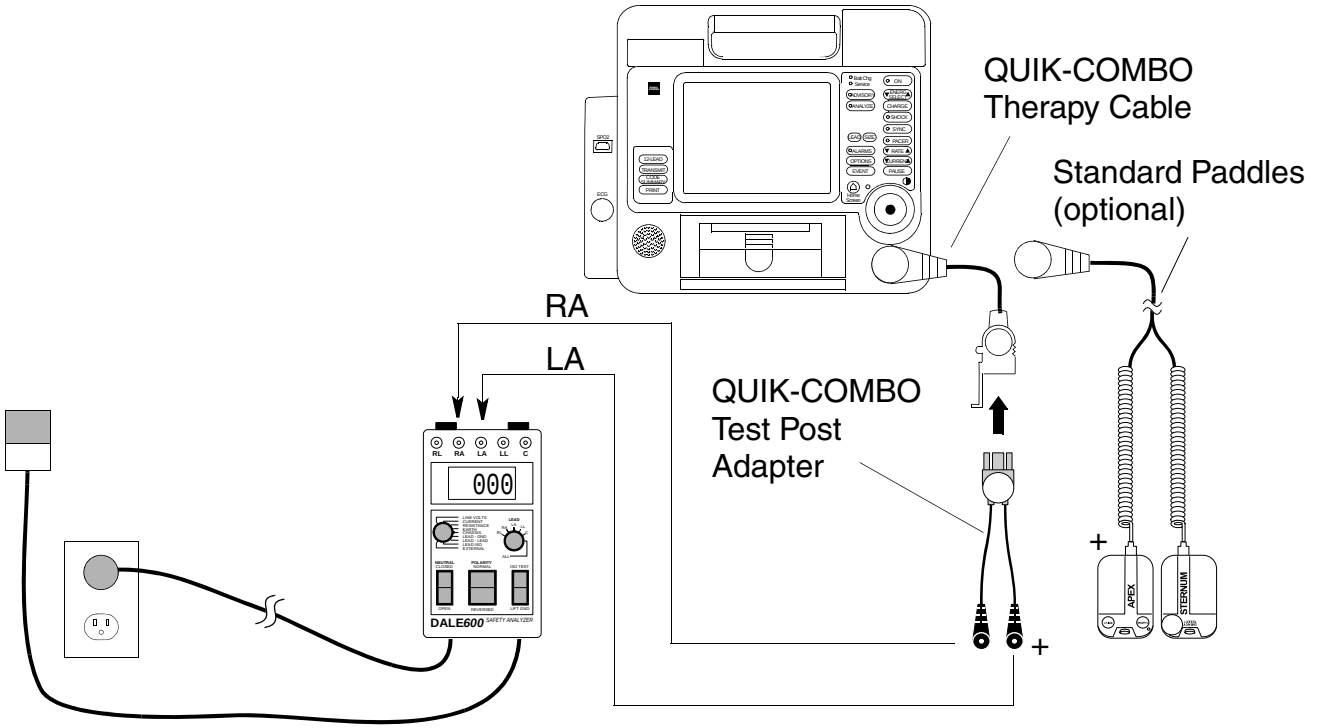
If the device operates with AC Power Adapter, perform tests in the **AC Operated Device** section.

PIP – Instructions *(continued)*

PIP – Battery Operated Device, Therapy Source Leakage Current Setup, Lead to Lead

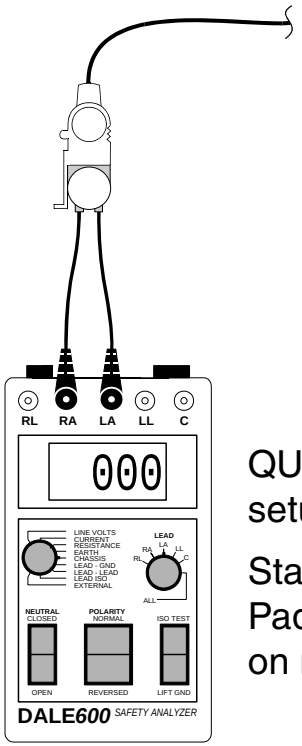
Note: If the device is configured for use with Standard Paddles, perform alternative Paddles source leakage current setup, shown below.

To test QUIK-COMBO (Paddles) source leakage current, Lead to Lead, set up the safety analyzer, and device, as shown below. Continue to the **PIP – Source Leakage Current, Lead to Lead Procedure** when you complete the setup.



PIP – Instructions *(continued)*

PIP – Battery Operated Device, Therapy Source Leakage Current, Lead to Lead Procedure



QUIK-COMBO setup

Standard Paddle hookup on next page

To test Source Leakage Current, Lead to Lead:

Note: Install a battery and complete this test on battery power.

1. Establish the **PIP – Source Leakage Current, Lead to Lead Setup** shown in the figure on the previous page.
2. Turn on the device.
3. Set the safety analyzer controls to:

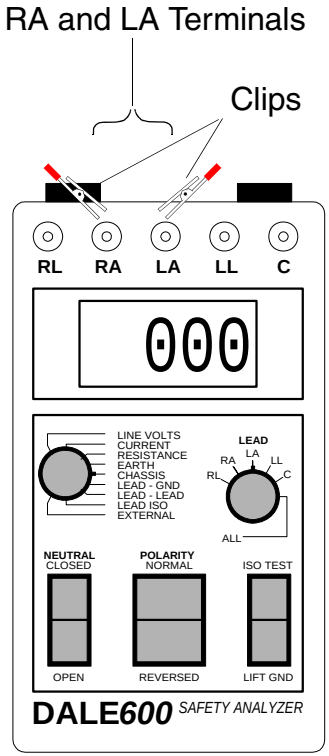
Neutral	Polarity	Mode		Lead
Closed	Normal	Leakage µa	Lead – Lead	LA

4. Verify the measured current is less than 10 µa.
5. Record all results on the **PIP Checklist**. **29**

(Continued on next page)

PIP – Instructions *(continued)*

PIP – Therapy Source Leakage Current, Lead to Lead Procedure (continued)



6. Turn off the device.
7. Continue to the **next leakage current test**.

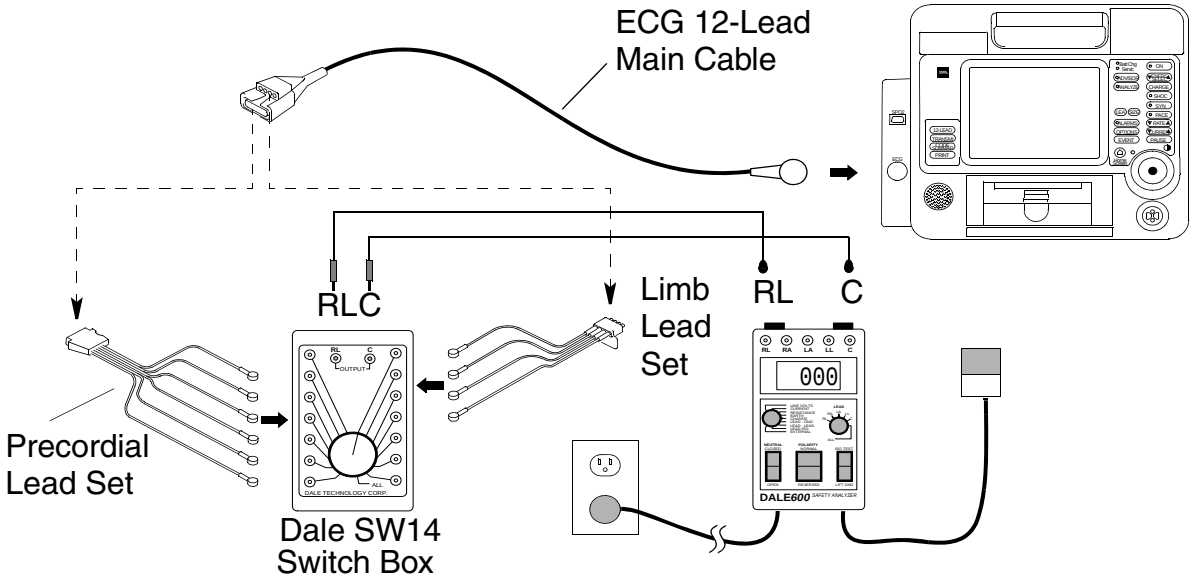
PIP – Instructions *(continued)*

PIP – Battery Operated Device, ECG 12-Lead Source Leakage Current Setup

Note: If the device is not configured with a 12-LEAD control, perform the **PIP – 3-Lead ECG Leakage Current** test instead of this test.

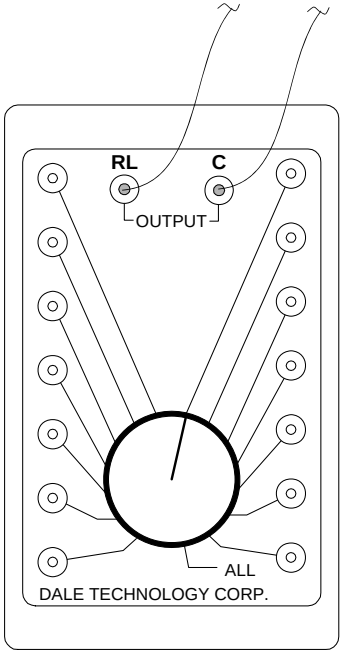
Note: If the Dale SW14 switch box is not available, perform the **PIP Alternative ECG 12-Lead Source Leakage Current Test Procedure**.

To test the ECG 12-Lead source leakage current, set up the safety analyzer, and device as shown below. Continue to the **PIP – ECG 12-Lead Source Leakage Current Procedure** when you complete the setup.



PIP – Instructions *(continued)*

PIP – Battery Operated Device, ECG 12-Lead Source Leakage Current Lead to Lead Procedure



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To test ECG 12-Lead Source Leakage Current, Lead to Lead:

Note: Install a battery and complete this test on battery power.

1. Establish the **PIP – ECG 12-Lead Source Leakage Current Setup** shown in the figure on the previous page.
2. Turn on the device.
3. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Closed	Normal	Leakage µA	Lead – Lead	RL

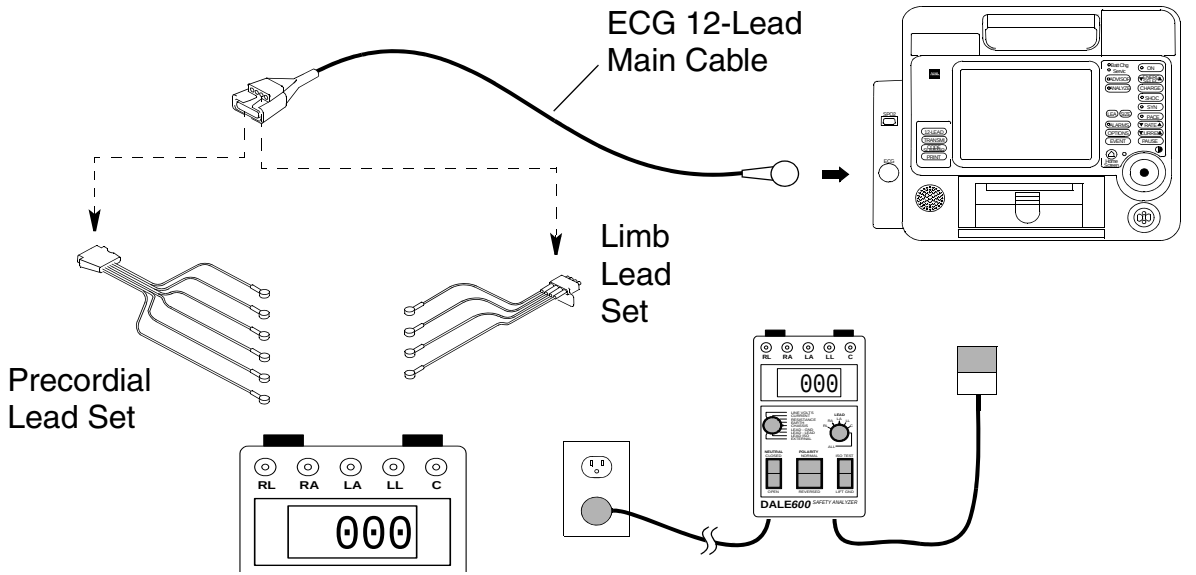
4. Set the Dale SW14 Switch Box control to RL.
5. Verify the measured current is less than 10 µA.
6. Repeat step 5 for each switch setting (RA, LA, LL, V1, V2, V3, V4, V5, and V6) on the Dale SW14 switch box.
7. Record all results on the **PIP Checklist**. **30**
8. Continue to the **PIP Therapy Sink Leakage Current Setup**.

PIP – Instructions *(continued)*

PIP – Battery Operated Device, Alternate ECG 12-Lead Source Leakage Current Setup

If the Dale SW14 Switch Box is not available, use this procedure to test 12-Lead source leakage.

Set up the safety analyzer, and device as shown below. Continue to the **PIP - Alternate ECG 12-Lead Source Leakage Current Procedure** when you complete the setup.



PIP – Instructions *(continued)*

PIP – Battery Operated Device, Alternate ECG 12-Lead Source Leakage Current Lead to Lead Procedure

To test ECG 12-Lead Source Leakage Current:

Note: Install a battery and complete this test on battery power.

1. Establish the **PIP - Alternate ECG 12-Lead Source Leakage Current Setup** shown in the figure on the previous page.
2. Turn on the device.
3. Connect the V6 lead to the C snap of the safety analyzer.
4. Connect each of the other patient leads individually to the RL snap on the safety analyzer.
5. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Closed	Normal	Leakage µA	Lead – Lead	RL

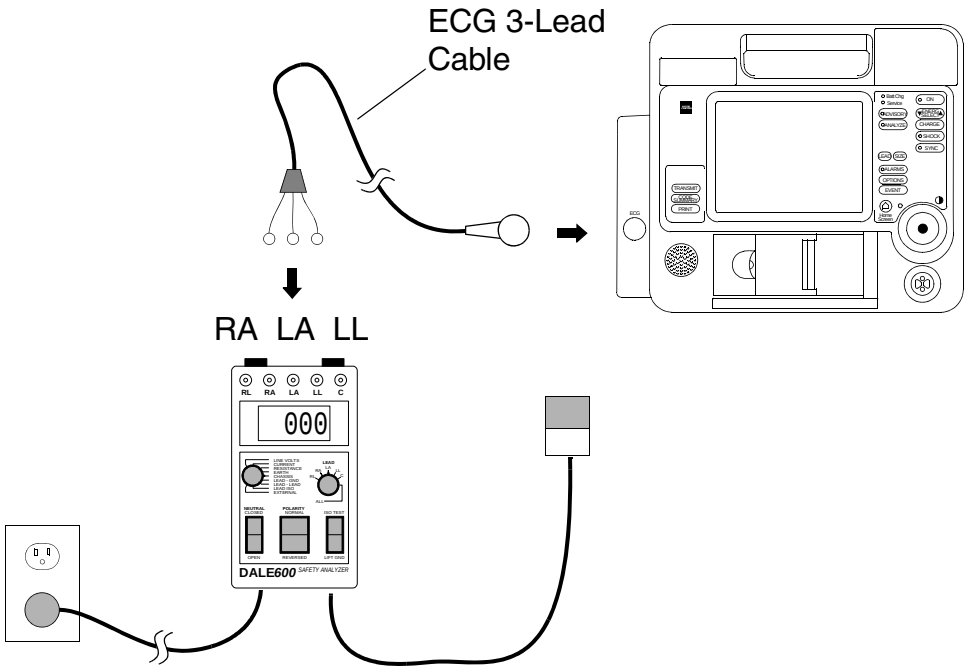
6. Verify that the measured current is less than 10 µA.
7. Repeat steps 4 and 6 for each remaining lead.
8. Record results on the **PIP Checklist**. **30**
9. Continue to the **PIP Therapy Sink Leakage Current Setup**.

PIP – Instructions *(continued)*

PIP– Battery Operated Device, ECG 3-Lead Source Leakage Current Setup

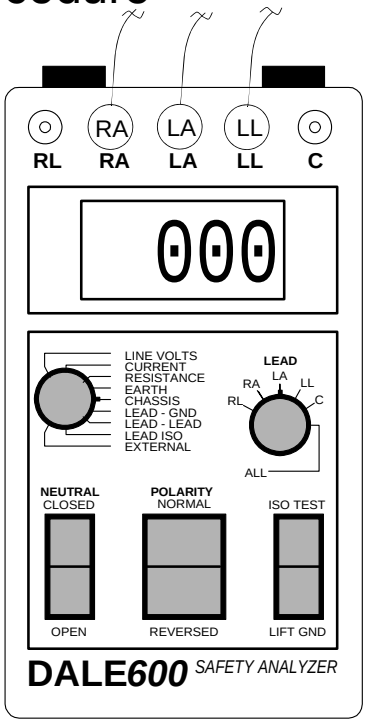
Note: If the device is configured with a 12-LEAD control, perform the **PIP – ECG 12-Lead Source Leakage Current** test instead of this test.

To test the ECG 3-Lead Source Leakage Current, set up the safety analyzer and device as shown below. Continue to the **PIP – ECG 3-Lead Source Leakage Current Procedure** when you complete the setup.



PIP – Instructions *(continued)*

PIP– Battery Operated Device, ECG 3-Lead Source Leakage Current, Lead to Lead Procedure



To test ECG 3-Lead Source Leakage Current:

Note: Install a battery and complete this test on battery power.

1. Establish the **PIP – ECG 3-Lead Source Leakage Current Setup** shown in the figure on the previous page.
2. Turn on the device.
3. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Closed	Normal	Leakage µA	Lead – Lead	**RA**

4. Verify that the measured current is less than 10 µA.
5. Repeat steps 3 & 4 for the remaining LA and LL leads.
6. Record all results on the **PIP Checklist**. **30**
7. Continue to the **PIP Therapy Sink Leakage Current Setup**.

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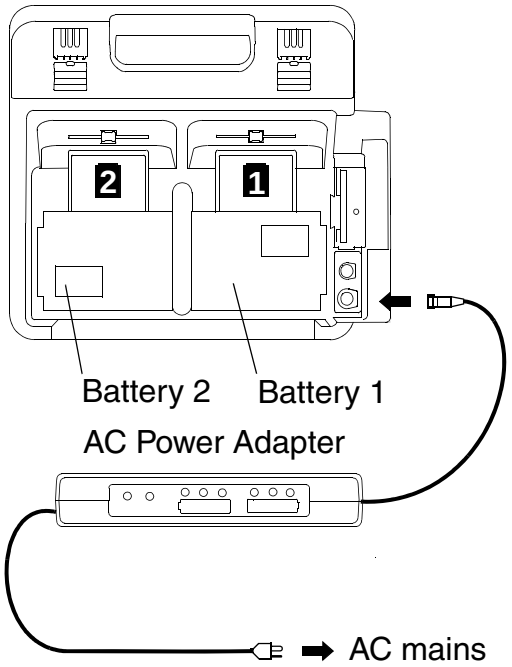
PIP – Instructions *(continued)*

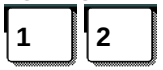
PIP – Power Source Management



To test auxiliary power switching:

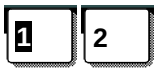
1. Connect the Power Adapter to the power source and the output cable to the Auxiliary Connector at the rear of the device. Refer to the **operating instructions – AC and DC Power Adapters** for more information.

2. Turn on the device and verify that the battery icons appear but neither is highlighted.

   Note: Battery indications may look slightly different.

3. Unplug the Power Adapter cable from the device Auxiliary Connector. One of the device battery icons is highlighted.

4. Record the results on the **PIP Checklist**. **31a**

(Continued on next page)

PIP – Instructions *(continued)*

PIP – Power Source Management (continued)

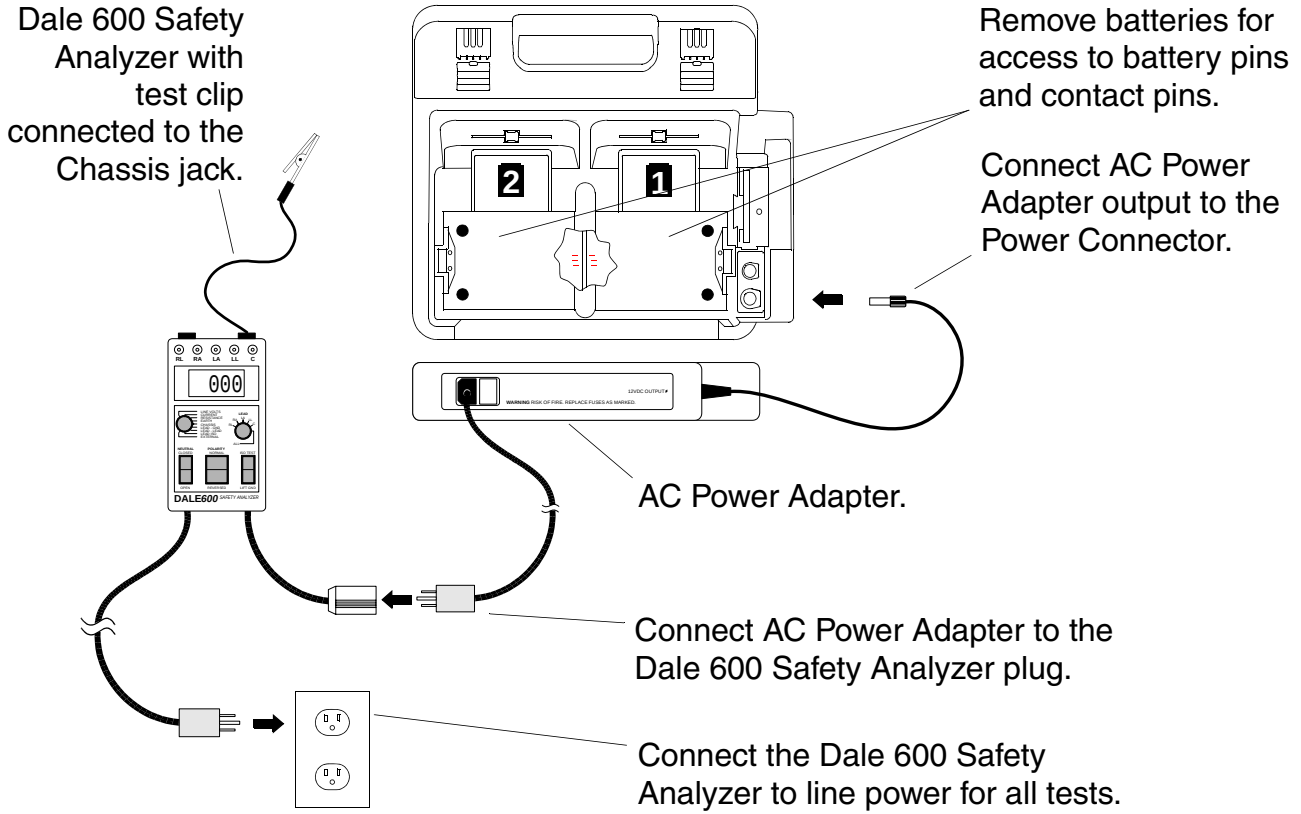
To test defibrillator charge current delivery with auxiliary power:

1. Turn off the device and remove both batteries.
2. Verify the Power Adapter is connected to the power source and the output cable is connected to the Auxiliary Connector at the rear of the device.
3. Turn on the device.
4. Press ENERGY SELECT and choose a level of 360 J.
5. Press CHARGE and note the charging cycle is 10 seconds or less.
6. Record the results on the **PIP Checklist**. **31b**
7. Turn off the device.
8. Disconnect the power adapter from the device and reinstall the two batteries.
9. For an ac operated device, continue to the **AC Operated Device Leakage Tests**, or for a dc power adapter operated device, refer to the **PIP Checklist.**

PIP – Instructions *(continued)*

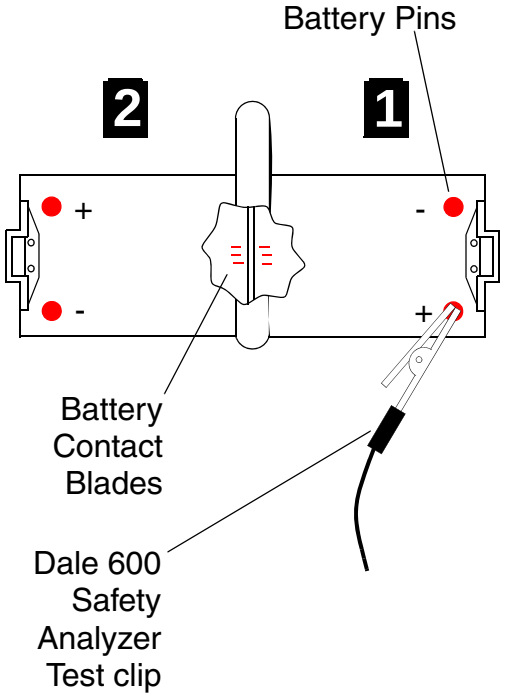
PIP – AC Operated Device, Chassis Leakage Current Setup

To test chassis leakage current, set up the safety analyzer, LIFEPAK 12 defibrillator/monitor, and AC Power Adapter as shown below. Continue to the **PIP – Chassis Leakage Current Procedure** when you complete the setup.



PIP – Instructions *(continued)*

PIP – AC Powered Device, Chassis Leakage Current Procedure



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To test Chassis Leakage Current:

1. Establish the **PIP – Chassis Leakage Current Setup** shown in the figure on the previous page. The device is off for this test.
2. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Closed	Normal/Reversed	Leakage µA	Lead – Chassis	All

Note: When operating the Polarity Switch, be sure to pause in the Off (middle) position when switching between Normal and Reversed Polarities.

3. Verify the AC Power Adapter is on.
4. Connect the analyzer clip to the positive (+) battery terminal of Battery Well 1 as shown at the left.
5. Verify measured current is less than 100 µA.
6. Press the LIFT GND button on the safety analyzer.
7. Verify measured current is less than 300 µA (120 vac) or less than 500 µA (240 vac).

(Continued on next page)

PIP – Instructions *(continued)*

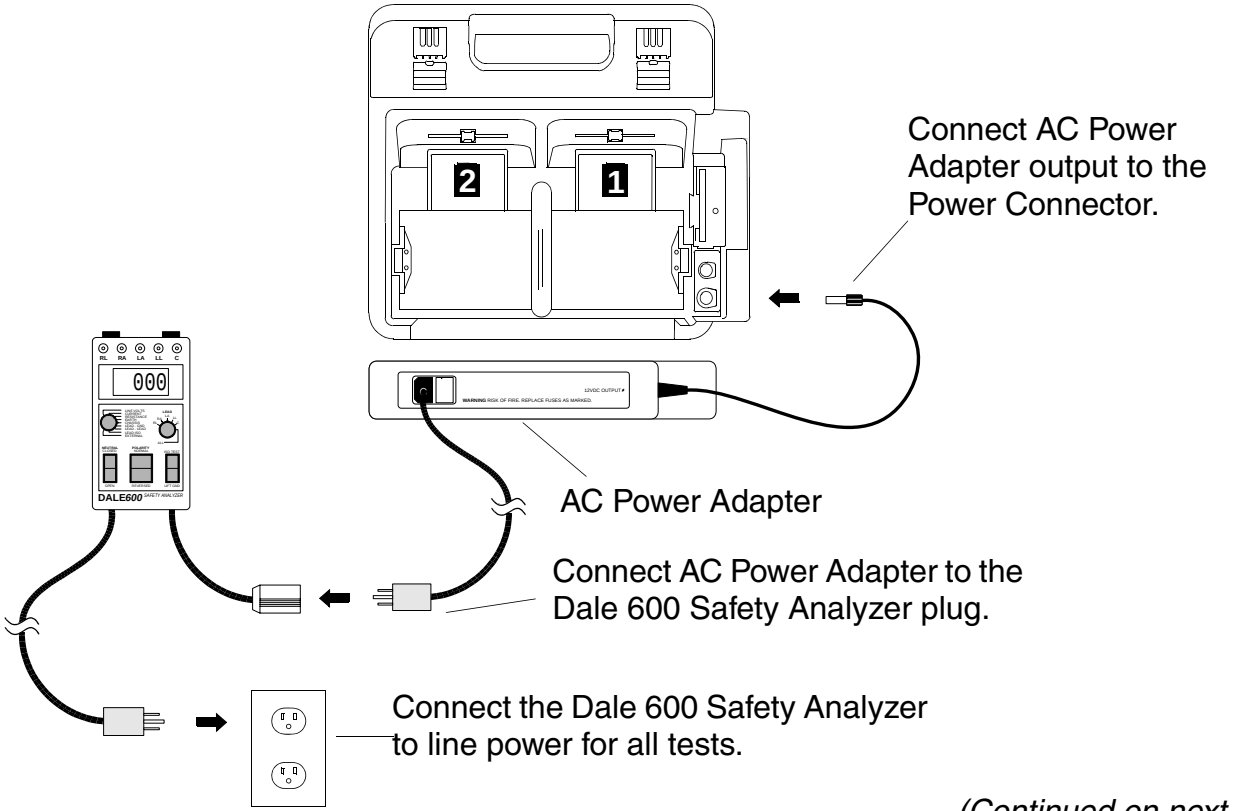
PIP – Chassis Leakage Current Procedure (continued)

8. Release the LIFT GND button on the safety analyzer.
9. Repeat steps 5 through 8 for the three remaining battery pins and all six battery contact blades on the A07 Contact PCB.
10. Record all results on the **PIP Checklist**. **32a-b**
11. Continue to the **next leakage current test**.

PIP – Instructions *(continued)*

PIP – AC Operated Device, Earth Leakage Current Setup

To test earth leakage current, set up the safety analyzer, device, and AC Power Adapter as shown below. Continue to the **PIP – Earth Leakage Current Procedure** when you complete the setup.



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(Continued on next page)

PIP – Instructions *(continued)*

PIP – AC Operated Device, Earth Leakage Current Procedure (continued)

To test Earth Leakage Current:

1. Establish the **PIP – Earth Leakage Current Setup** shown in the figure on the previous page.
2. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Closed	Normal	Leakage µA	Earth	Any

3. Verify the AC Power Adapter is on.
4. Verify measured current is less than 2500 µA.
5. Record the results in the **PIP Checklist**. **33a**
6. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Open	Normal	Leakage µA	Earth	Any

PIP – Instructions *(continued)*

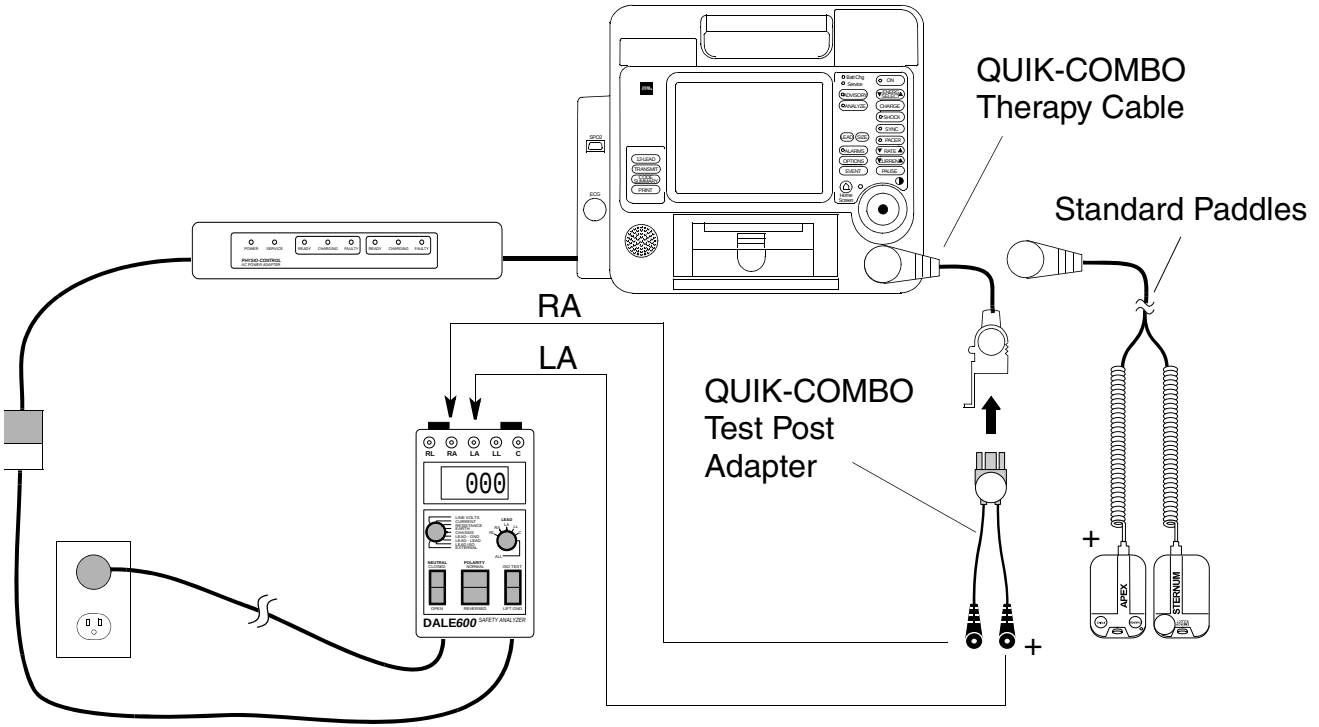
PIP – Earth Leakage Current Procedure (continued)

7. Verify measured current is less than 5000 µA.
8. Record the results in the **PIP Checklist**. **33b**
9. Continue to the **next leakage current test**.

PIP – Instructions *(continued)*

PIP – AC Operated Device,Therapy Source Leakage Current Setup, Lead to Gnd

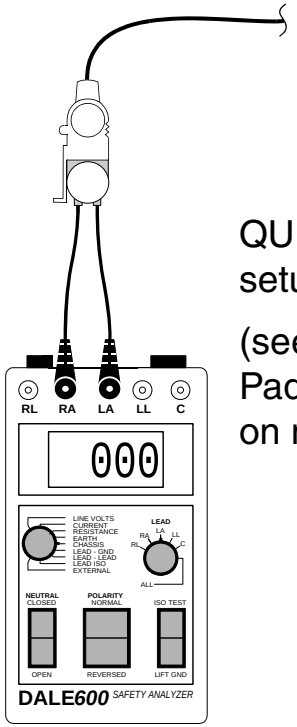
To test QUIK-COMBO or Standard Paddles source leakage current, set up the safety analyzer, device, and AC Power Adapter as shown. Continue to the **PIP – Source Leakage Current, Lead to GND Procedure** when you complete the setup.



200

PIP – Instructions *(continued)*

PIP – AC Operated Device,Therapy Source Leakage Current, Lead to Gnd Procedure (continued)



QUIK-COMBO setup

(see Standard Paddles setup on next page)

To test QUIK-COMBO or Standard Paddles Source Leakage Current, Lead to Gnd:

1. Establish the **PIP – Source Leakage Current, Lead to Gnd Setup** shown in the figure on the previous page.
2. Verify that the AC Power Adapter is on.
3. Turn on the device.
4. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Closed	Normal/Reversed	Leakage µA	Lead – Gnd	All

Note: When operating the Polarity Switch, be sure to pause in the Off (middle) position when switching between Normal and Reversed Polarities.

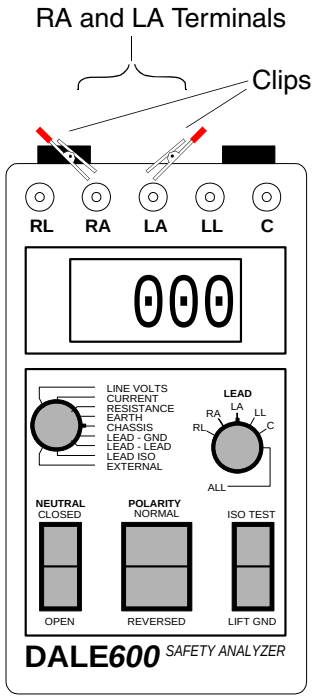
5. Verify the measured current is less than 10 µA.
6. Press the LIFT GND button on the safety analyzer.
7. Verify the measured current is less than 50 µA. Release the LIFT GND button.

(Continued on next page)

PIP – Instructions *(continued)*

PIP – Therapy Source Leakage Current, Lead to Gnd Procedure (continued)

8. Record results on the **PIP Checklist**. **34a-b**
9. Turn off the device.
10. Continue to the **next leakage current test**.



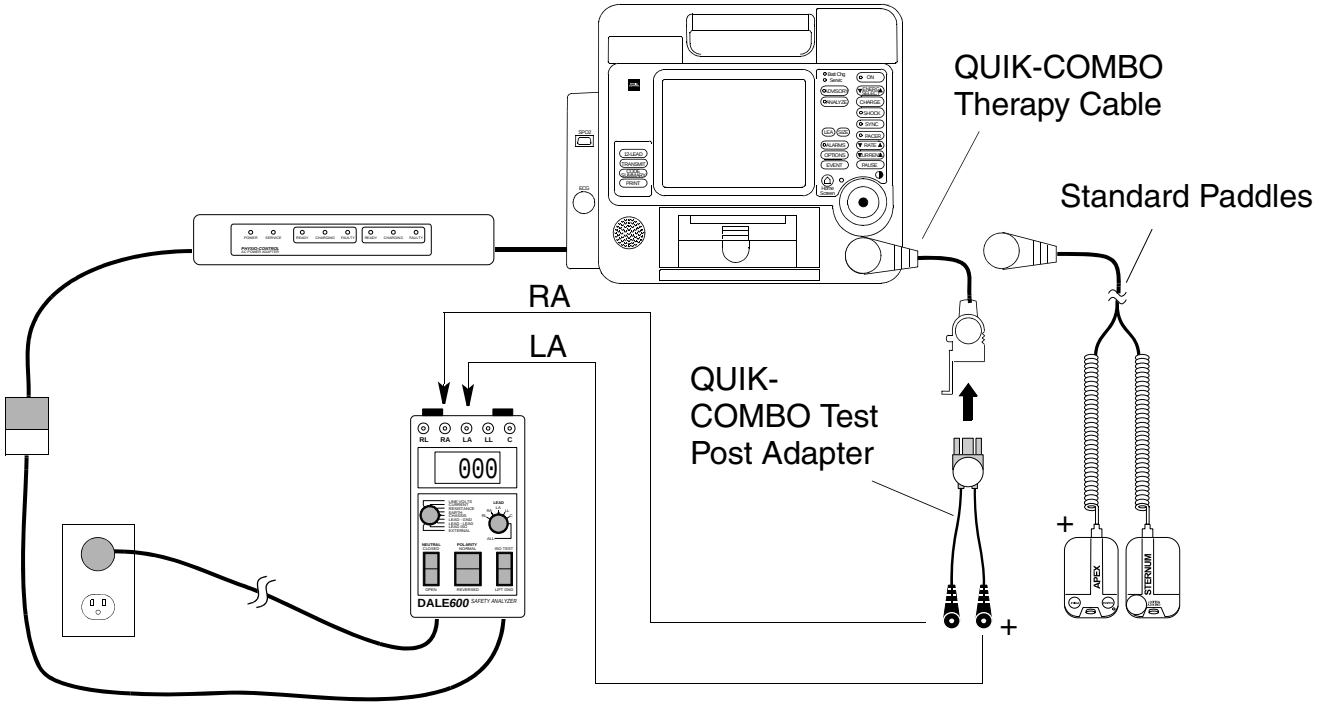
Standard Paddles setup

(see QUIK-COMBO setup on previous page)

PIP – Instructions *(continued)*

PIP – AC Operated Device,Therapy Source Leakage Current Setup, Lead to Lead

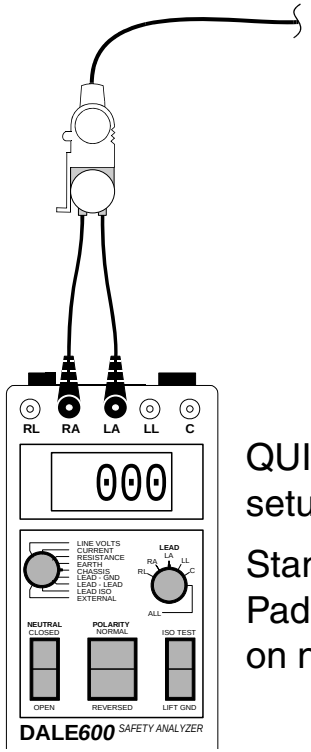
To test QUIK-COMBO or Standard Paddles source leakage current, Lead to Lead, set up the safety analyzer, device, and AC Power Adapter as shown below. Continue to the **PIP – Source Leakage Current, Lead to Lead Procedure** when you complete the setup.



(Continued on next page)

PIP – Instructions *(continued)*

PIP – Therapy Source Leakage Current, Lead to Lead Procedure (continued)



QUIK-COMBO setup.

Standard Paddle hookup on next page

To test Source Leakage Current, Lead to Lead:

1. Establish the **PIP – Source Leakage Current, Lead to Lead Setup** shown in the figure on the previous page.
2. Verify that the AC Power Adapter is on.
3. Turn on the device.
4. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Closed	NormalReversed	Leakage µA	Lead – Lead	LA

Note: When operating the Polarity Switch, be sure to pause in the Off (middle) position when switching between Normal and Reversed Polarities.

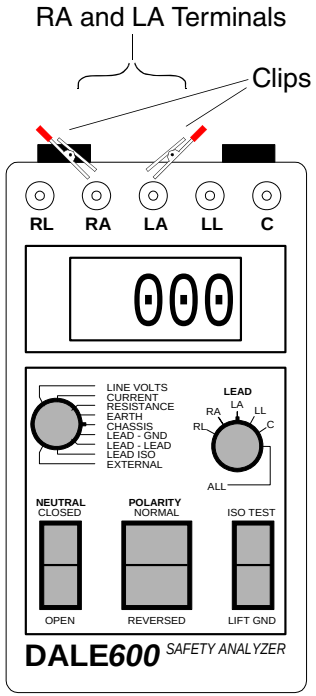
5. Verify the measured current is less than 10 µA.
6. Press the LIFT GND button on the safety analyzer.
7. Verify the measured current is less than 50 µA.
8. Release the LIFT GND button.

(Continued on next page)

PIP – Instructions *(continued)*

PIP – Therapy Source Leakage Current, Lead to Lead Procedure (continued)

9. Record all results on the **PIP Checklist**. **35a-b**
10. Turn off the device.
11. Continue to the **next leakage current test**.



Standard Paddles setup

(see QUIK-COMBO setup on previous page)

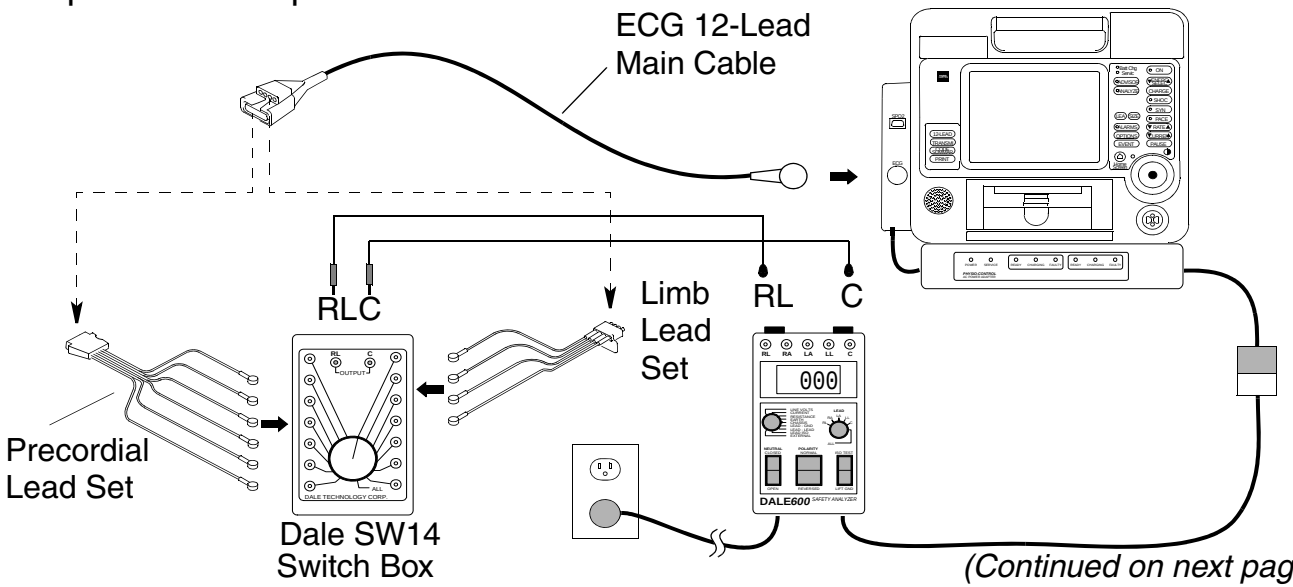
PIP – Instructions *(continued)*

PIP – AC Operated Device, ECG 12-Lead Source Leakage Current Setup

Note: If the device is not configured with a 12-LEAD control, perform the **PIP – 3-Lead ECG Leakage Current** test instead of this test.

Note: If the Dale SW14 switch box is not available, perform the **PIP Alternative ECG 12-Lead Source Leakage Current Test Procedure**.

To test the ECG 12-Lead source leakage current, set up the safety analyzer, device, and AC Power Adapter as shown below. Continue to the **PIP– ECG 12-Lead Source Leakage Current Lead to Gnd Procedure** when you complete the setup or **PIP- ECG 12-Lead Lead to Lead Procedure**.



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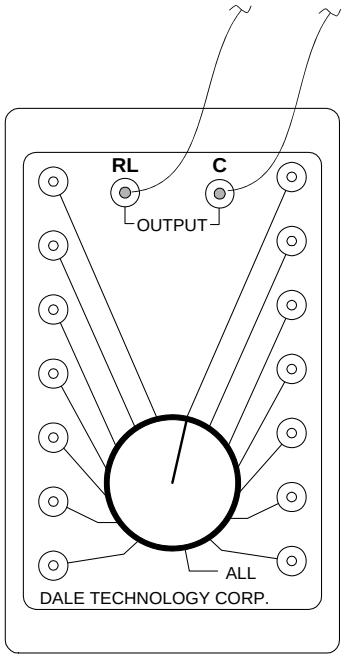
PIP – Instructions *(continued)*

PIP – AC Operated Device, ECG 12-Lead Source Leakage Current Lead to Gnd Procedure



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To test ECG 12-Lead Source Leakage Current:

1. Establish the **PIP – ECG 12-Lead Source Leakage Current Setup** shown in the figure on the previous page.
2. Verify that the AC Power Adapter is on.
3. Turn on the device.
4. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Closed	Normal/Reversed	Leakage µA	Lead – Gnd	RL

Note: When operating the Polarity Switch, be sure to pause in the Off (middle) position when switching between Normal and Reversed Polarities.

5. Set the Dale SW14 Switch Box control to ALL.
6. Verify the measured current is less than 10 µA.
7. Press the LIFT GND button on the safety analyzer.
8. Verify the measured current is less than 50 µA.
9. Release the LIFT GND button.

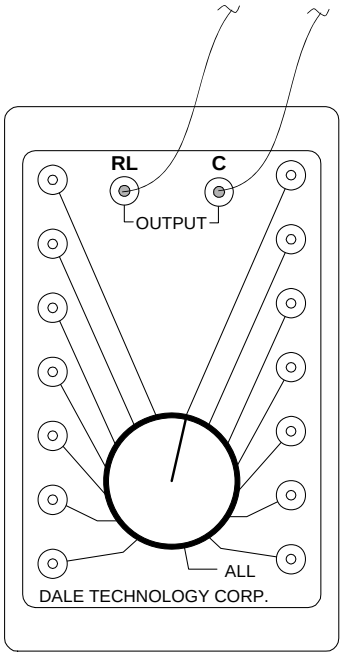
PIP – Instructions *(continued)*

PIP – ECG 12-Lead Source Leakage Current, Lead to Gnd Procedure (continued)

10. Record results on the **PIP Checklist**. **36a-b**
11. Turn off the device.
12. Continue to the **next leakage current test**.

PIP – Instructions *(continued)*

PIP – AC Operated Device, ECG 12-Lead Source Leakage Current Lead to Lead Procedure



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To test ECG 12-Lead Source Leakage Current, Lead to Lead:

1. Establish the **PIP – ECG 12-Lead Source Leakage Current Setup** shown in the figure on the previous page.
2. Verify that the AC Power Adapter is on.
3. Turn on the device.
4. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Closed	Normal/Reversed	Leakage µA	Lead – Lead	RL

Note: When operating the Polarity Switch, be sure to pause in the Off (middle) position when switching between Normal and Reversed Polarities.

5. Set the Dale SW14 Switch Box control to RL.
6. Verify the measured current is less than 10 µA.
7. Press the LIFT GND button on the safety analyzer.
8. Verify the measured current is less than 50 µA.
9. Release the LIFT GND button.

(Continued on next page)

PIP – Instructions *(continued)*

PIP – ECG 12-Lead Source Leakage Current Lead to Lead Procedure (continued)

10. Repeat steps 6 through 9 for each switch setting (RA, LA, LL, V1, V2, V3, V4, V5, and V6) on the Dale SW14 switch box. Record all results on the **PIP Checklist**. **37a-b**
11. Turn off the device.
12. Continue to the **PIP Therapy Sink Leakage Current Setup**.

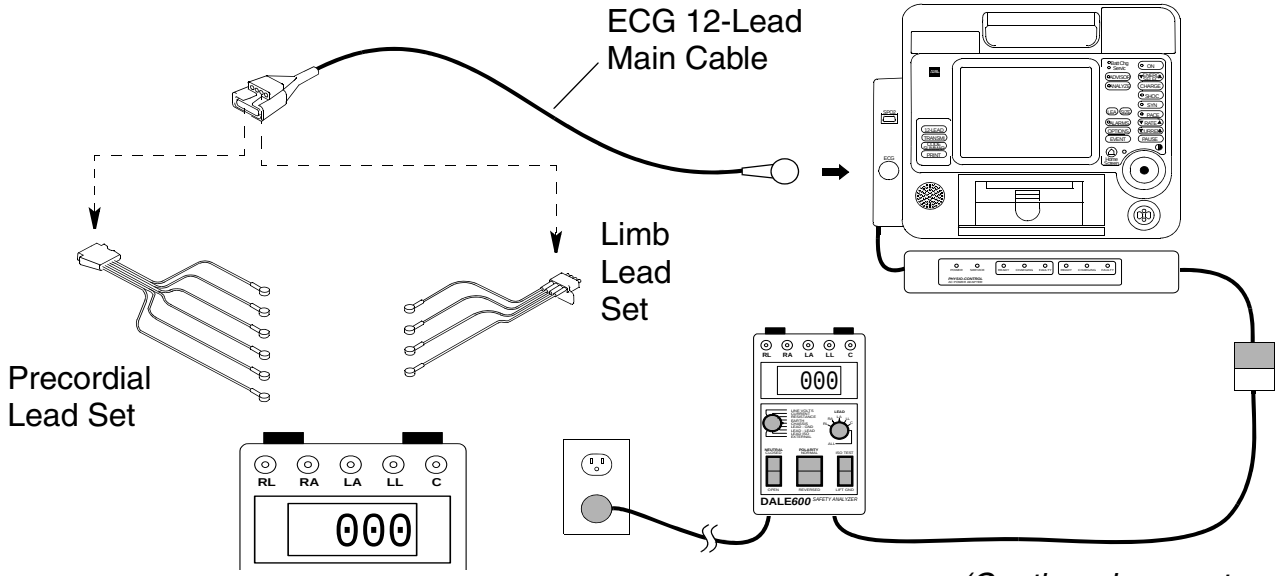
PIP – Instructions *(continued)*

PIP – AC Operated, Device, Alternate ECG 12-Lead Source Leakage Current Setup

If the Dale SW14 Switch Box is not available, use this procedure to test 12-Lead source leakage.

Note: If the Dale SW14 switch box is available, perform the **PIP ECG 12-Lead Source Leakage Current Test Procedure**.

Set up the safety analyzer, device, and the AC Power Adapter as shown below. Continue to the **PIP - Alternate ECG 12-Lead Source Leakage Current Procedure** when you complete the setup.



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PIP – Instructions *(continued)*

PIP – AC Operated Device, Alternate ECG 12-Lead Source Leakage Current, Lead to Gnd Procedure

To test ECG 12-Lead Source Leakage Current, Lead to Gnd:

1. Establish the **PIP - Alternate ECG 12-Lead Source Leakage Current Setup** shown in the figure on the previous page.
2. Verify that the AC Power Adapter is on.
3. Turn on the device.
4. Using clip-lead jumpers, connect all of the limb lead and precordial lead snaps together, and connect them to the RL snap on the safety analyzer.
5. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Closed	Normal/Reversed	Leakage µA	Lead – Ground	ALL

Note: When operating the Polarity Switch, be sure to pause in the Off (middle) position when switching between Normal and Reversed Polarities.

6. Verify that the measured current is less than 10 µA.
7. Press the LIFT GND button on the safety analyzer.

(Continued on next page)

PIP Instructions *(continued)*

PIP – Alternate ECG 12-Lead Source Leakage Current Lead to Gnd Procedure (continued)

8. Verify that the measured current is less than 50 µA.
9. Release the LIFT GND button.
10. Record all results on the **PIP Checklist**. **36a-b**
11. Turn off the device.
12. Continue to **next leakage current test**.

PIP – Instructions *(continued)*

PIP – AC Operated Device, Alternate ECG 12-Lead Source Leakage Current Lead to Lead Procedure

To test ECG 12-Lead Source Leakage Current:

1. Establish the **PIP - Alternate ECG 12-Lead Source Leakage Current Setup** shown in the figure on the previous page.
2. Verify that the AC Power Adapter is on.
3. Turn on the device.
4. Connect the V6 lead to the C snap of the safety analyzer.
5. Connect each of the other patient leads individually to the RL snap on the safety analyzer.
6. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Closed	Normal/Reversed	Leakage µA	Lead – Lead	RL

Note: When operating the Polarity Switch, be sure to pause in the Off (middle) position when switching between Normal and Reversed Polarities.

7. Verify that the measured current is less than 10 µA.
8. Press the LIFT GND button on the safety analyzer.

(Continued on next page)

PIP Instructions *(continued)*

PIP – Alternate ECG 12-Lead Source Leakage Current Procedure (continued)

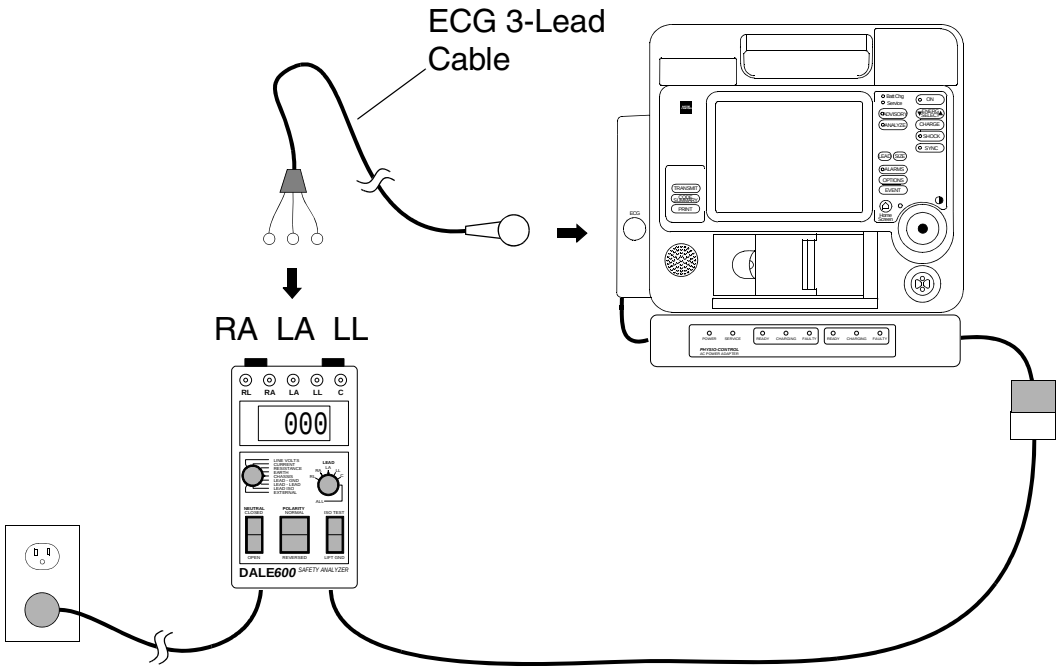
9. Verify that the measured current is less than 50 µA
10. Release the LIFT GND button.
11. Repeat steps 5, 7, 8, 9 and 10 for each remaining lead.
12. Record all results on the **PIP Checklist**. **37a-b**
13. Turn off the device.
14. Continue to the **PIP Therapy Sink Leakage Current Setup**.

PIP – Instructions *(continued)*

PIP – AC Operated Device, ECG 3-Lead Source Leakage Current Setup

Note: If the device is configured with a 12-LEAD control, perform the **PIP – ECG 12-Lead Source Leakage Current** test instead of this test.

To test the ECG 3-Lead Source Leakage Current, set up the safety analyzer, device, and AC Power Adapter as shown below. Continue to the **PIP – ECG 3-Lead Source Leakage Current Procedure** when you complete the setup.



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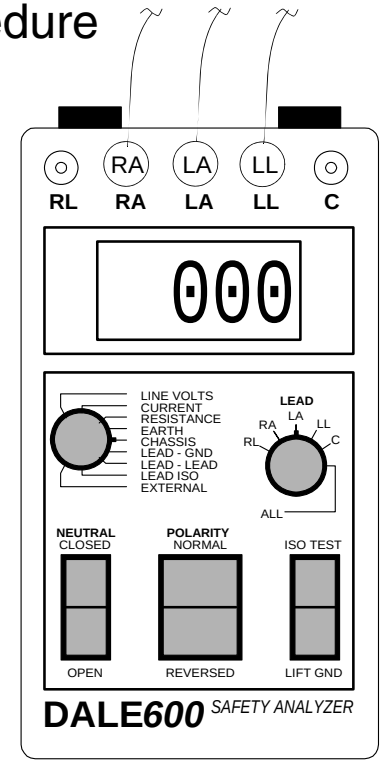
PIP – Instructions *(continued)*

PIP – AC Operated Device, ECG 3-Lead Source Leakage Current, Lead to Gnd Procedure



To test ECG 3-Lead Source Leakage Current:

1. Establish the **PIP – ECG 3-Lead Source Leakage Current Setup** shown in the figure on the previous page.
2. Verify that the AC Power Adapter is on.
3. Turn on the device.
4. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Closed	Normal/Reversed	Leakage µA	Lead – Gnd	ALL

Note: When operating the Polarity Switch, be sure to pause in the Off (middle) position when switching between Normal and Reversed Polarities.

5. Verify the measured current is less than 10 µA.
6. Press the LIFT GND button on the safety analyzer.
7. Verify the measured current is less than 50 µA.
8. Release the LIFT GND button.

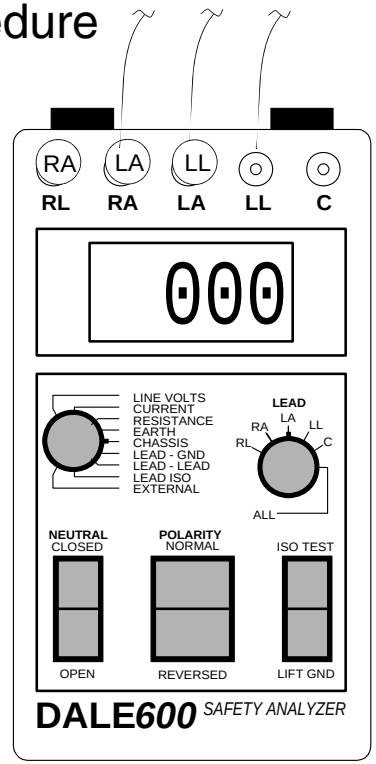
PIP – Instructions *(continued)*

PIP – ECG 3-Lead Source Leakage Current, Lead to Gnd Procedure (continued)

9. Record all results on the **PIP Checklist**. **36a-b**
10. Turn off the device.
11. Continue to the **next leakage current test**.

PIP – Instructions *(continued)*

PIP – AC Operated Device, ECG 3-Lead Source Leakage Current, Lead to Lead Procedure



To test ECG 3-Lead Source Leakage Current:

1. Establish the **PIP – ECG 3-Lead Source Leakage Current Setup** shown in the figure on the previous page.
2. Verify that the AC Power Adapter is on.
3. Turn on the device.
4. Set the safety analyzer controls to:.

Neutral	Polarity	Mode		Lead
Closed	Normal/Reversed	Leakage µA	Lead – Lead	RA

Note: When operating the Polarity Switch, be sure to pause in the Off (middle) position when switching between Normal and Reversed Polarities.

5. Verify that the measured current is less than 10 µA.
6. Press the LIFT GND button on the safety analyzer.
7. Verify that the measured current is less than 50 µA.
8. Release the LIFT GND button.

(Continued on next page)

PIP – Instructions *(continued)*

PIP – ECG 3-Lead Source Leakage Current, Lead to Lead Procedure (continued)

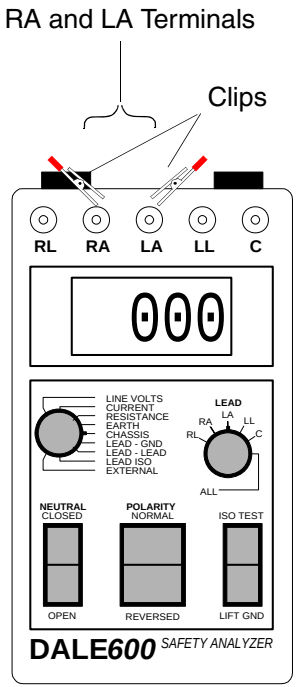
9. Repeat steps 4 through 8 for the remaining LA and LL leads.
10. Record all results on the **PIP Checklist**. **37a-b**
11. Turn off the device.
12. Continue to the **PIP Therapy Sink Leakage Current Setup**.

PIP – Instructions *(continued)*

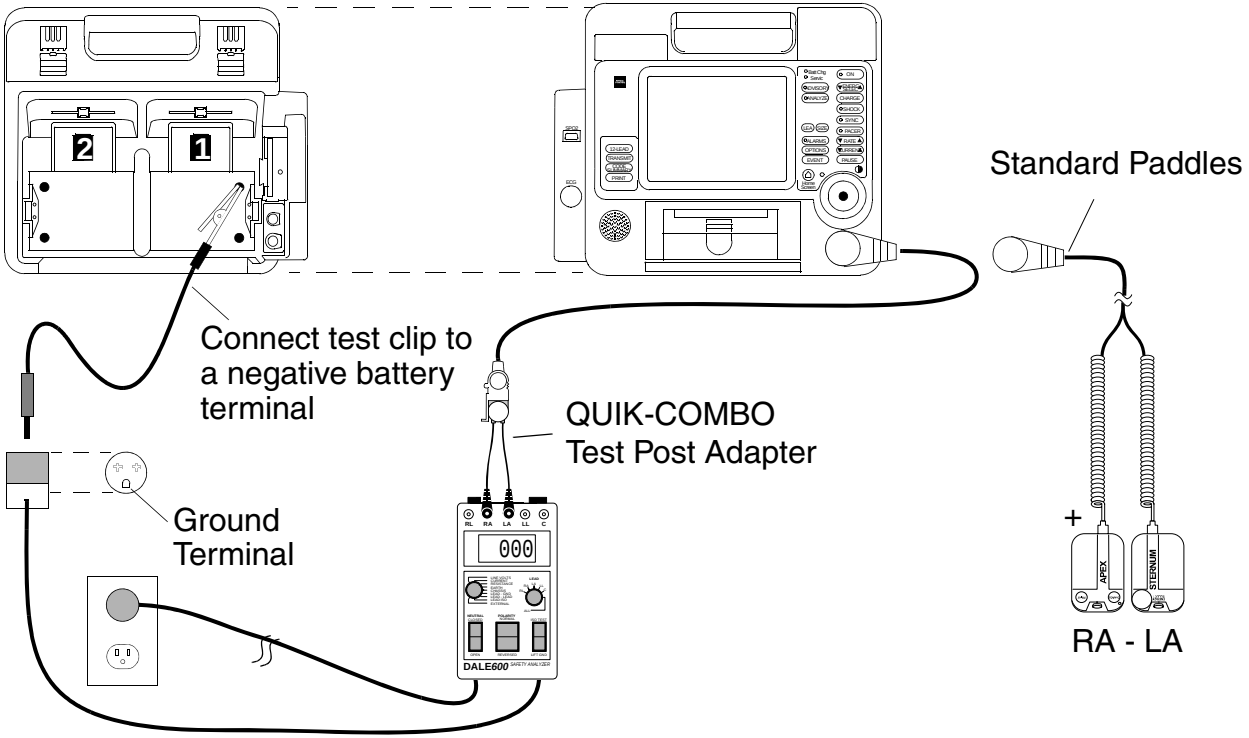
PIP – Therapy Sink Leakage Current Setup

Note: Power Adapter or Batteries are not installed.

To test the QUIK-COMBO or Standard Paddles sink leakage current, set up the safety analyzer and device as shown for QUIK-COMBO or Standard Paddles. Continue to the **PIP – Therapy Sink Leakage Current Procedure** when you complete the setup.



Standard Paddles setup



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(Continued on next page)

PIP – Instructions *(continued)*

PIP – Therapy Sink Leakage Current Procedure

To test QUIK-COMBO or Standard Paddles Sink Leakage Current:

1. Establish the appropriate **PIP – Therapy Sink Leakage Current Setup** shown on the previous page.

WARNING!

Shock hazard. During sink leakage tests high voltage is present on the safety analyzer electrode snaps. Do not touch the analyzer snaps or device connections during these tests.

2. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Closed	Normal	Leakage µA	Lead Iso	All

3. Momentarily press the ISO TEST button on the safety analyzer and observe the measured current reading.
4. Release the ISO TEST button.
5. Verify the following measured currents:

	120 Vac	240 Vac
QUIK-COMBO	less than 50 µA	less than 100 µA
Standard Paddles	less than 100 µA	less than 500 µA

PIP – Instructions *(continued)*

PIP – Therapy Sink Leakage Current Procedure (continued)

6. Record the results on the PIP Checklist **38** in the **Power Adapter Operated Device Testing** section or the **Battery Operated Device Testing** section.
7. Continue to the **next leakage current test**.

PIP – Instructions *(continued)*

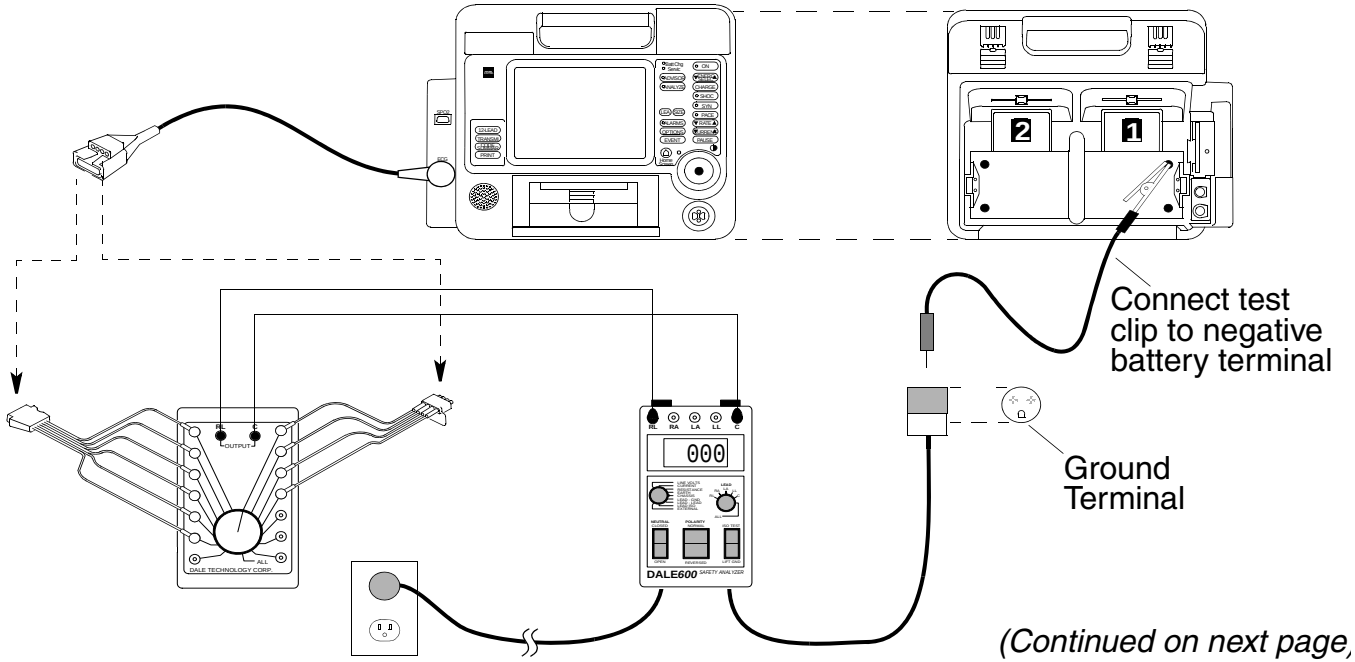
PIP – ECG 12-Lead Sink Leakage Current Setup

Note: Power Adapter or batteries are not installed.

If the device is not configured with a 12-LEAD control, perform the **PIP – 3-Lead Sink Leakage Current** test instead of this test.

Note: If the Dale SW14 switch box is not available, perform the **PIP Alternative ECG 12-Lead Sink Leakage Current Test Procedure**.

To test the ECG 12-Lead Sink Leakage Current, set up the safety analyzer and device as shown below. Continue to the **PIP – ECG 12-Lead Sink Leakage Current Procedure** when you complete the setup.



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PIP – Instructions *(continued)*

PIP – ECG 12-Lead Sink Leakage Current Procedure

To test ECG 12-Lead Sink Leakage Current:

1. Establish the **PIP – ECG 12-Lead Sink Leakage Current Setup** shown in the figure on the previous page.

WARNING!

Shock hazard. During sink leakage tests high voltage is present on the safety analyzer electrode snaps. Do not touch the analyzer snaps or device connections during these tests.

2. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Closed	Normal	Leakage µA	Lead Iso	All

3. On the Dale SW14 Switch Box set the control to ALL.
4. Momentarily press the ISO TEST button on the analyzer and observe the current reading.
5. Release the ISO TEST button.
6. Record the results on the PIP Checklist in the **Power Adapter Operated Device Testing** section or the **Battery Operated Device Testing** section.
7. Continue to next **PIP - SpO2 Sink Leakage Current Test**.

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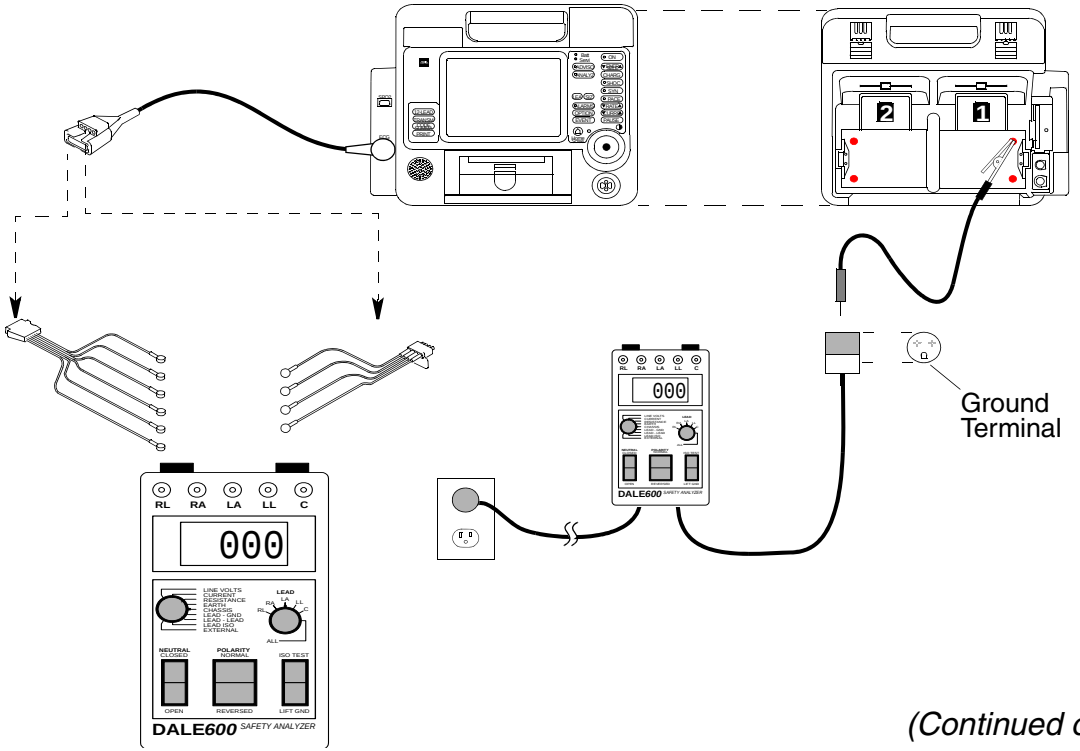
PIP – Instructions *(continued)*

PIP – Alternate ECG 12-Lead Sink Leakage Current Setup

Note: Power Adapter or Batteries are not installed.

If the device is not configured with a 12-LEAD control, perform the **PIP – 3-Lead Sink Leakage Current** test instead of this test.

Set up the safety analyzer and the device as shown below. Continue to the PIP – Alternate ECG 12-Lead Sink Leakage Current Procedure when you completethe setup.



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PIP – Instructions *(continued)*

PIP – Alternate ECG 12-Lead Sink Leakage Current Procedure

To test ECG 12-Lead Sink Leakage Current:

1. Establish the PIP – ECG 12-Lead Sink Leakage Current Setup shown in the figure on the previous page.

WARNING!

Shock hazard. During sink leakage tests high voltage is present on the safety analyzer electrode snaps. Do not touch the analyzer snaps or device connections during these tests.

2. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Closed	Normal	Leakage µA	Lead ISO	All

3. Using clip-lead jumpers, connect all of the limb lead and precordial lead snaps together, and connect them to the RL snap on the safety analyzer.
4. Momentarily press the ISO TEST button on the safety analyzer, and observe the current reading.
5. Release the ISO TEST button.

(Continued on next page)

PIP – Instructions *(continued)*

PIP – Alternate ECG 12-Lead Sink Leakage Current Procedure (continued)

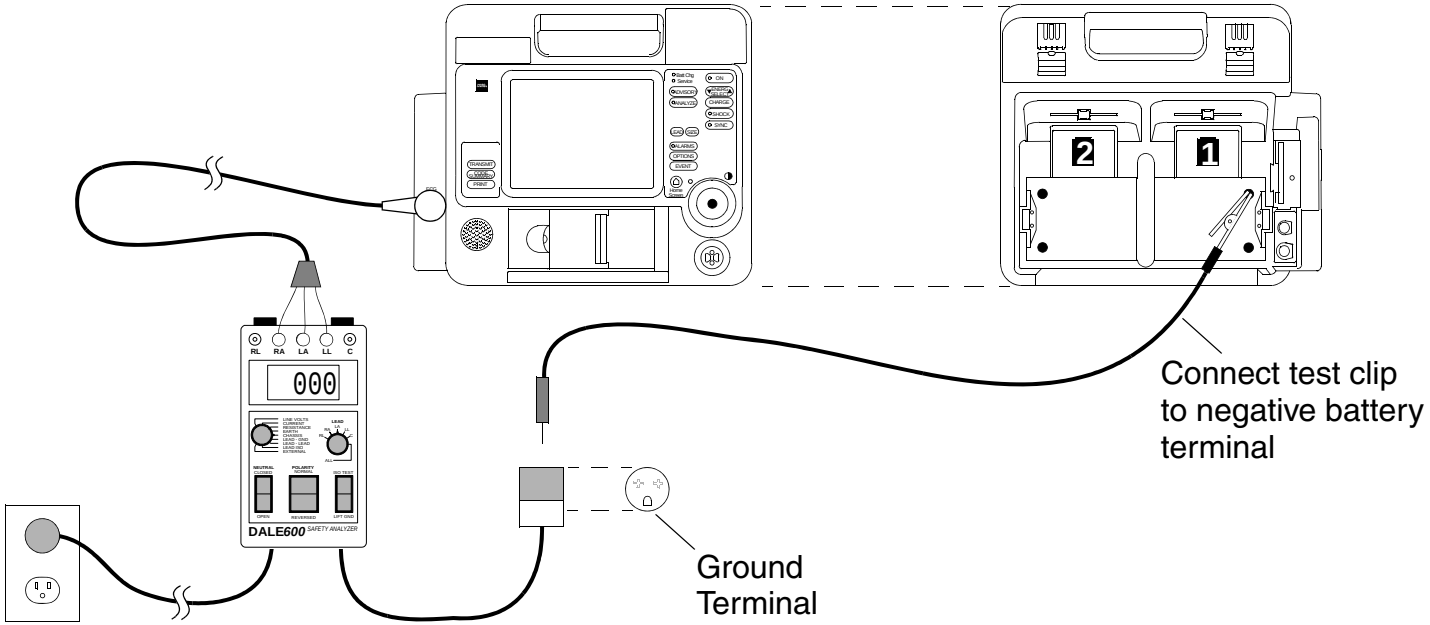
6. Verify that the measured current is less than 50 µA.
7. Record the results on the PIP Checklist n the **Power Adapter Operated Device Testing** section or the **Battery Operated Device Testing** section. **39**
8. Continue to the next **PIP - SpO2 Sink Leakage Current Test**.

PIP – Instructions *(continued)*

PIP – ECG 3-Lead Sink Leakage Current Setup

Note: Power Adapter or Batteries are not installed.

To test the ECG 3-Lead Sink Current, set up the safety analyzer and device as shown below. Continue to the **PIP – ECG 3-Lead Sink Leakage Current Procedure** when you complete the setup.



PIP – Instructions *(continued)*

PIP – ECG 3-Lead Sink Leakage Current Procedure

To test ECG 3-Lead Sink Leakage Current:

1. Establish the **PIP – ECG 3-Lead Sink Leakage Current Setup** shown in the figure on the previous page.

WARNING!

Shock hazard. During sink leakage tests, high voltage is present on the safety analyzer electrode snaps. Do not touch the analyzer snaps or device connections during these tests.

2. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Closed	Normal	Leakage µA	Lead Iso	All

3. Momentarily press the ISO TEST button on the safety analyzer and observe the current reading.
4. Release the ISO TEST button.
5. Record the results on the PIP Checklist in the **Power Adapter Operated Device Testing** section or the **Battery Operated Device Testing** section.
6. Continue to the next **PIP - SpO2 Sink Leakage Current Test**.

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PIP – Instructions *(continued)*

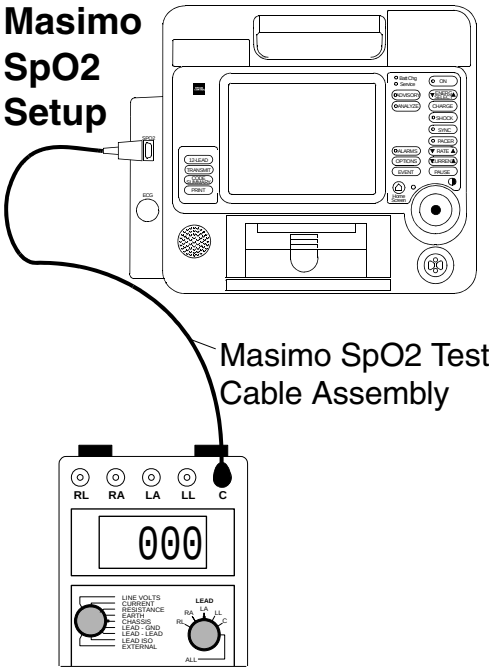
PIP – SpO2 Sink Leakage Current Setup

Note: Power Adapter or batteries are not installed.

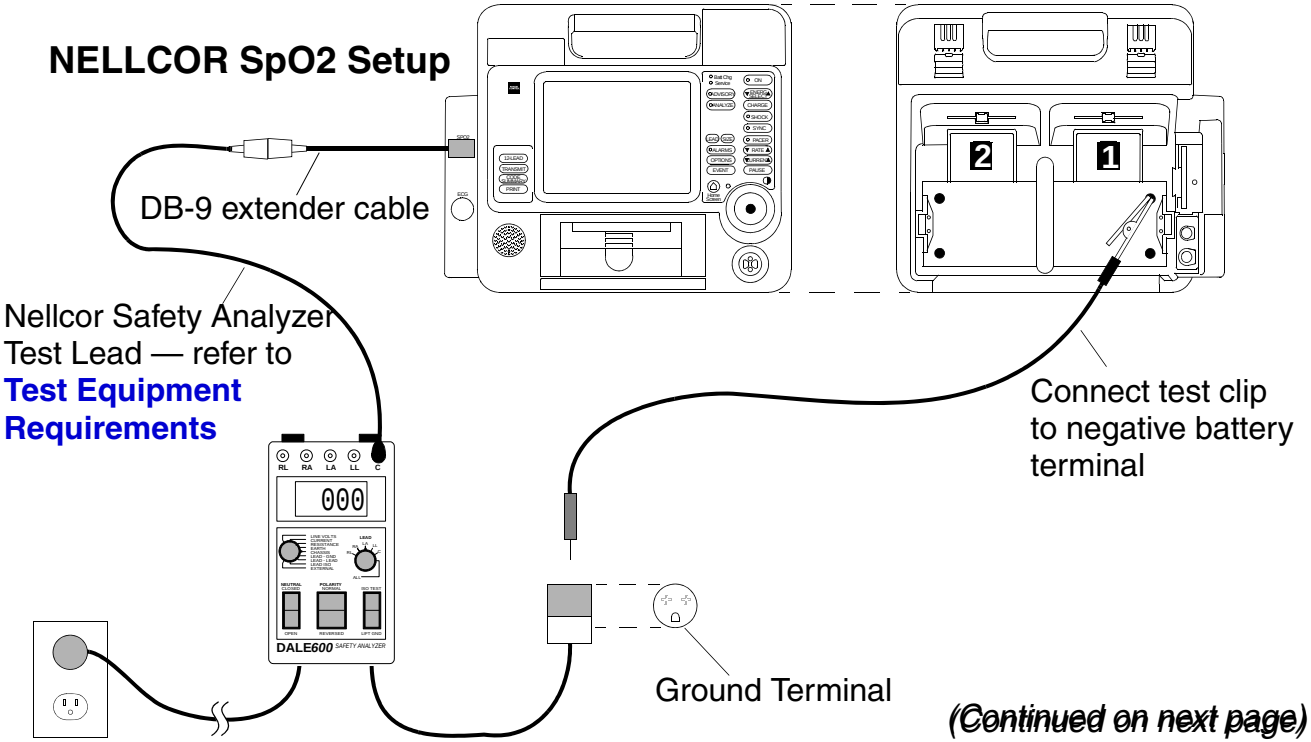
Note: Complete the following only for devices equipped with the SpO2 option. If not, go to the next required test on the PIP Checklist.

To test SpO2 Sink Leakage Current, set up the safety analyzer and device as shown below. Continue to the **PIP – SpO2 Sink Leakage Current Procedure** when you complete the setup.

Masimo SpO2 Setup



NELLCOR SpO2 Setup



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PIP – Instructions *(continued)*

PIP – SpO2 Sink Leakage Current Procedure

To test SpO2 Sink Leakage Current:

1. Establish the **PIP – SpO2 Sink Leakage Current Setup** shown in the figure on the previous page.

WARNING! Shock hazard. During sink leakage tests, high voltage is present on the safety analyzer electrode snaps. Do not touch the analyzer snaps or device connections during these tests.

2. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Closed	Normal	Leakage µA	Lead Iso	C

3. Momentarily press the ISO TEST button on the safety analyzer and observe the measured current reading.
4. Release the ISO TEST button.
5. Verify that the measured current is less than 100 µA (120 vac) or less than 500 µA (240 vac).
6. Record the results on the PIP Checklist in the **Power Adapter Operated Device Testing** section or the **Battery Operated Device Testing** section. **40**

Note: For DC-PA connected devices, also perform **Power Source Management test**.

(Continued on next page)

PIP – Power Adapter Instructions

PIP – Power Adapter

Note: **This section of the PIP tests stand-alone Power Adapters.**

1. Connect the Power Adapter under test (device) to power source.
2. Verify that the green POWER LED turns on.

   Note: When the power adapter is first turned on, it performs a brief self-test. During this test all LEDs turn on for a few seconds. If the test is successful, all the LEDs turn off, with the exception of the green POWER LED.

3. Connect the output cable to the Auxiliary Connector at the rear of a LIFEPAK 12 defibrillator/monitor. Refer to the **operating instructions – AC/DC Power Adapters** for more information.
4. Install two charged batteries in the LIFEPAK 12 defibrillator/monitor.
5. Verify that the CHARGING indicator for either Battery 1 or Battery 2 is backlit.

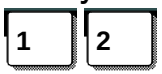
PIP – Power Adapter Instructions *(continued)*

PIP – Power Adapter (continued)

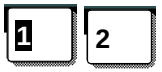
Note: If the batteries are installed in the defibrillator, the power adapter LEDs illuminate as follows:

- READY (green): battery is fully charged
- CHARGING (amber): battery is charging
- FAIL (red): discard/ recycle batteries
- SERVICE (red): power adapter needs service immediately. Remove power adapter from use immediately.

6. Turn on the LIFEPAK 12 defibrillator/monitor.
7. Verify that the battery icons appear on the display, but neither is highlighted.



8. Unplug the Power Adapter cable from the LIFEPAK 12 defibrillator/monitor.
9. Verify that one of the battery icons on the monitor display is highlighted.



10. Record the results on the **PIP Checklist**. **1a**

PIP – Power Adapter Instructions *(continued)*

PIP – Power Adapter (continued)

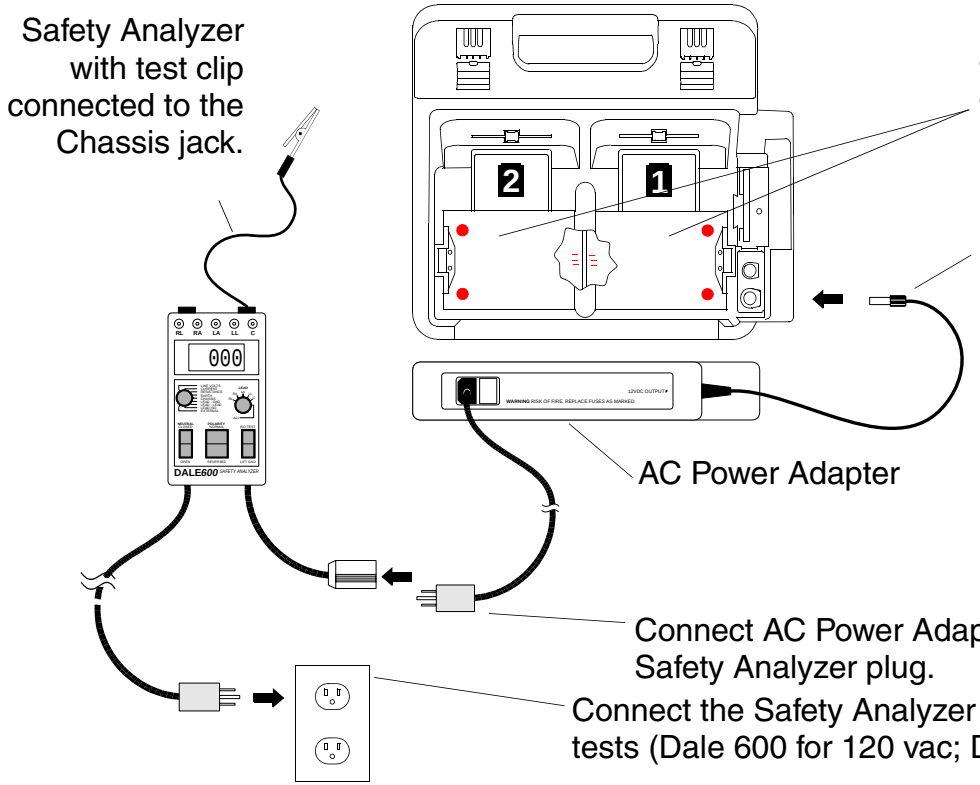
11. Turn off the LIFEPAK 12 defibrillator/monitor and remove both batteries.
12. Plug the Power Adapter into the LIFEPAK 12 defibrillator/monitor, and turn the LIFEPAK 12 defibrillator/monitor on.
13. Press ENERGY SELECT and choose a level of 360 joules.
14. Press CHARGE and note the charging cycle is 10 seconds or less.
15. Record the results on the **PIP Checklist**. **1b**
16. Turn off the LIFEPAK 12 defibrillator/monitor. Continue to the next test.

(Continued on next page)

PIP – Power Adapter Instructions *(continued)*

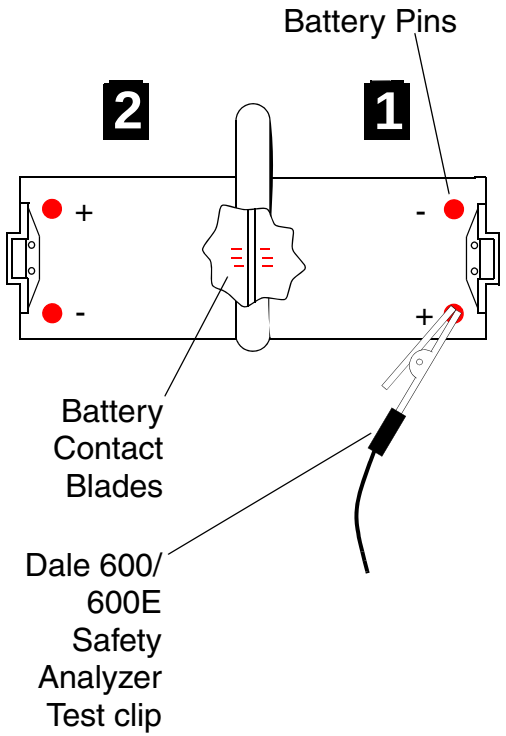
PIP – AC Power Adapter Chassis Leakage Current Setup

To test AC Power Adapter chassis leakage current, set up the safety analyzer, AC Power Adapter (device), and LIFEPAK 12 defibrillator/monitor as shown below. Continue to the **PIP – AC Power Adapter Chassis Leakage Current Procedure** when you complete the setup.



PIP – Power Adapter Instructions *(continued)*

PIP – AC Power Adapter Chassis Leakage Current Procedure



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Note: AC Power Adapter Chassis Leakage Current test results are summarized in the **Leakage Current Specifications Summary Table**.

To test AC Power Adapter Chassis Leakage Current:

1. Establish the **PIP – AC Power Adapter Chassis Leakage Current Setup** shown in the figure on the previous page. The LIFEPAK 12 is turned off for this test.
2. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Closed	Normal/Reversed	Leakage µA	Lead – Chassis	All

Note: When operating the Polarity Switch, be sure to pause in the Off (middle) position when switching between Normal and Reversed Polarities.

3. Verify the AC Power Adapter (device) is on.
4. Connect the analyzer clip to the positive (+) battery terminal of Battery Well 1 as shown at the left.
5. Verify measured current is less than 100 µA.
6. Press the LIFT GND button on the safety analyzer.

PIP – Power Adapter Instructions *(continued)*

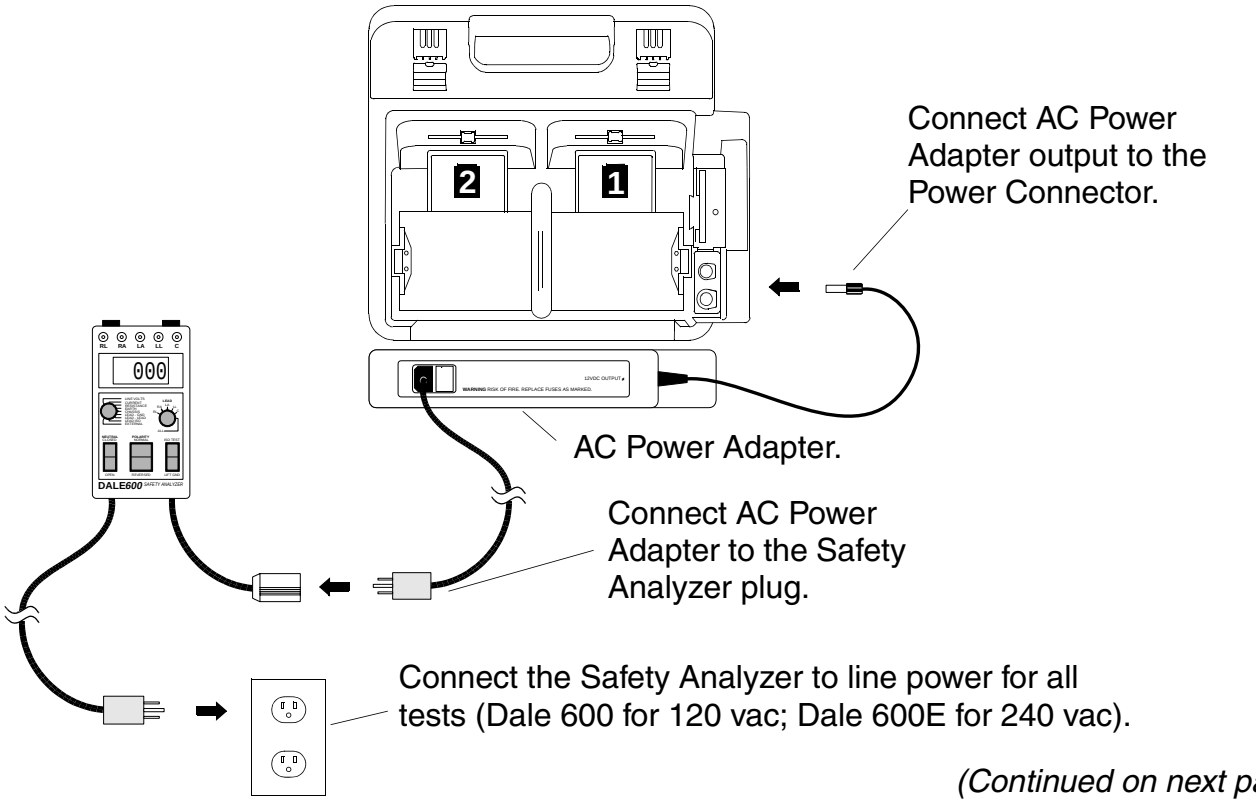
PIP – AC Power Adapter Chassis Leakage Current Procedure (continued)

7. Verify measured current is less than 300 µA (120 vac) or less than 500 µA (240 vac).
8. Release the LIFT GND button
9. Repeat steps 4 through 8 for the three remaining battery pins and all six battery contact blades on the A07 Contact PCB.
10. Record all results on the **PIP Checklist**. **2a-b**
11. Continue directly to the next leakage current test.

PIP – Power Adapter Instructions *(continued)*

PIP – AC Power Adapter Earth Leakage Current Setup

To test AC Power Adapter earth leakage current, set up the safety analyzer, AC Power Adapter (device), and LIFEPAK 12 defibrillator/monitor as shown below. Continue to the **PIP – AC Power Adapter Earth Leakage Current Procedure** when you complete the setup.



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PIP – Power Adapter Instructions *(continued)*

PIP – AC Power Adapter Earth Leakage Current Procedure

Note: AC Power Adapter Earth Leakage Current test results are summarized in the **Leakage Current Specifications Summary Table**.

To test AC Power Adapter Earth Leakage Current:

1. Establish the **PIP – AC Power Adapter Earth Leakage Current Setup** shown in the figure on the previous page.
2. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Closed	Normal	Leakage µA	Earth	Any

3. Verify that the AC Power Adapter (device) is on. Verify measured current is less than 2500 µa. Record the results in the **PIP Checklist**. **3a**
4. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Open	Normal	Leakage µA	Earth	Any

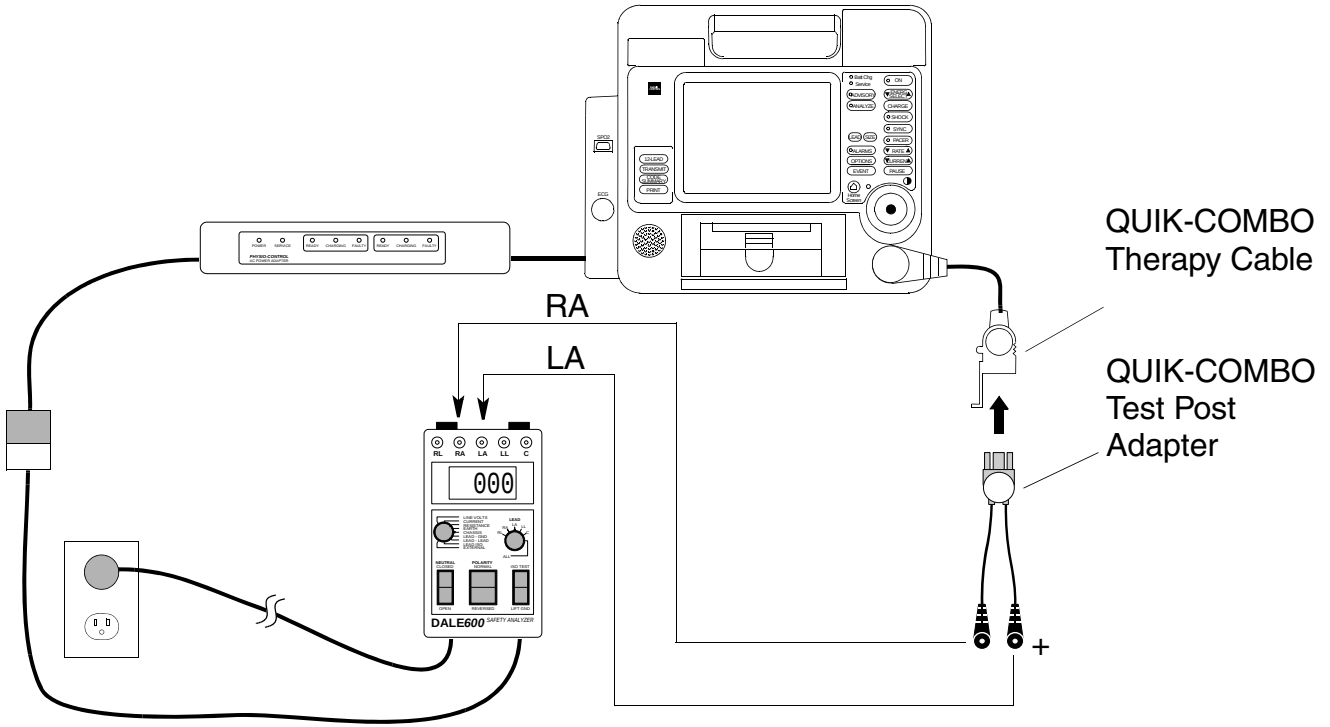
5. Verify that the measured current is less than 5000 µA. Record the results in the **PIP Checklist**. **3b**

(Continued on next page)

PIP – Power Adapter Instructions *(continued)*

PIP – AC Power Adapter QUIK-COMBO Source Leakage Current Setup

To test AC Power Adapter QUIK-COMBO source leakage current, set up the safety analyzer, AC Power Adapter (device), and LIFEPAK 12 defibrillator/monitor as shown below. Continue to the **PIP – AC Power Adapter QUIK-COMBO Source Leakage Current Procedure** when you complete the setup.



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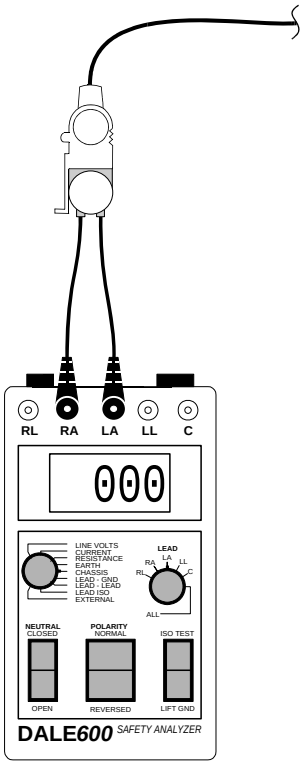
PIP – Power Adapter Instructions *(continued)*

PIP – AC Power Adapter QUIK-COMBO Source Leakage Current Procedure



Note: AC Power Adapter QUIK-COMBO Source Leakage Current test results are summarized in the **Leakage Current Specifications Summary Table**.

To test AC Power Adapter QUIK-COMBO Source Leakage Current:

1. Establish the **PIP – AC Power Adapter QUIK-COMBO Source Leakage Current Setup** shown in the figure on the previous page.
2. Verify that the AC Power Adapter (device) is on.
3. Turn on the LIFEPAK 12 defibrillator/monitor.
4. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Closed	Normal/Reversed	Leakage µA	Lead – Gnd	All

Note: When operating the Polarity Switch, be sure to pause in the Off (middle) position when switching between Normal and Reversed Polarities.

5. Verify that the measured current is less than 10 µA.
6. Press the LIFT GND button on the safety analyzer.
7. Verify that the measured current is less than 50 µA.

(Continued on next page)

PIP – Power Adapter Instructions *(continued)*

PIP – AC Power Adapter QUIK-COMBO Source Leakage Current Procedure (continued)

8. Release the LIFT GND button.
9. Set the safety analyzer controls to:

Neutral	Polarity	Mode		Lead
Closed	Normal/Reversed	Leakage µA	Lead – Lead	LA

Note: When operating the Polarity Switch, be sure to pause in the Off (middle) position when switching between Normal and Reversed Polarities.

10. Repeat steps 5 through 8 for Lead – Lead leakage.
11. Record all results on the **PIP Checklist**. 4a-b
12. Turn off the LIFEPAK 12 defibrillator/monitor.
13. Turn off the AC Power Adapter.

(Continued on next page)

PIP – Summary of Leakage Current Specifications

The following summarizes leakage current specifications. NC=Normal Condition SFC = Single Fault Condition

Leakage Test		Maximum Leakage Current Specifications	
Type of Test	**Lead Test**	**Analyzer @ 120 vac**	**Analyzer @ 240 vac**
Chassis Leakage	Positive Battery	NC: 100 µA	NC: 100 µA
	Terminal	SFC: 300 µA	SFC: 500 µA
	Negative Battery	NC: 100 µA	NC: 100 µA
	Terminal	SFC: 300 µA	SFC: 500 µA
	Contacts	NC: 100 µA	NC: 100 µA
		SFC: 300 µA	SFC: 500 µA
Earth Leakage	Closed Neutral	2500 µA	2500 µA
	Open Neutral	5000 µA	5000 µA
QUIK-COMBO Source LEAD-GND	All–GND	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
QUIK-COMBO Source LEAD-LEAD	RA or LA	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA

(Continued on next page)

PIP – Summary of Leakage Current Specifications *(continued)*

Leakage Test		Maximum Leakage Current Specifications	
Type of Test	**Lead Test**	**Analyzer @ 120 vac**	**Analyzer @ 240 vac**
Paddles Source LEAD-GND	All–GND	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
Paddles Source LEAD-LEAD	RA or LA	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
12-Lead ECG Source LEAD-GND	All-GND	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA

(Continued on next page)

PIP – Summary of Leakage Current Specifications *(continued)*

Leakage Test		Maximum Leakage Current Specifications	
Type of Test	**Lead Test**	**Analyzer @ 120 vac**	**Analyzer @ 240 vac**
12-Lead ECG Source LEAD-LEAD	RA	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
	LA	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
	RL	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
	LL	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
	V1	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
	V2	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA

PIP – Summary of Leakage Current Specifications *(continued)*

Leakage Test		Maximum Leakage Current Specifications	
Type of Test	**Lead Test**	**Analyzer@ 120 vac**	**Analyzer @ 240 vac**
12-Lead ECG Source LEAD-LEAD (continued)	V3	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
	V4	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
	V5	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
	V6	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA
3-Lead ECG Source LEAD-GND	All–GND	NC: 10 µA	NC: 10 µA
		SFC: 50 µA	SFC: 50 µA

Instrument Calibration

This section contains the Test and Calibration Procedures (TCP). Perform the procedures in this section as necessary after replacing device components or to correct out-of-specification conditions detected during the PIP. The following procedures may be performed in any order.

Note: Any time the device is calibrated or opened for repair or component replacement, it must successfully pass all portions of the closed-case **Performance Inspection Procedures (PIP)**.

TCP – Scope and Applicability

This TCP applies to the LIFEPAK 12 defibrillator/monitor exclusively. You may perform the procedures outlined in this section in any order.

Note: Prior to its return to active use, the LIFEPAK 12 defibrillator/monitor must successfully pass all portions of the closed-case **Performance Inspection Procedures (PIP)** anytime the device is opened for repair, component replacement, or after calibration.

Refer to **TCP – Resource Requirements** for necessary equipment, test equipment verification, workstation power, and qualifications of the TCP personnel.

Refer to **TCP – Test Equipment Requirements** for a list of test equipment, including specifications, required to complete the TCP.

TCP – Resource Requirements

This section describes the requirements for TCP equipment, TCP test equipment verification, TCP workstation power, and TCP personnel.

TCP – Equipment

To perform the TCP, you must use the equipment listed in the **TCP – Test Equipment Requirements** table. Although the table lists specific test equipment by manufacturer, test equipment with equivalent specifications may be substituted.

Note: Using test equipment other than that specified in the PIP – Test Equipment Requirements table may provide test results that are different from those specified in this manual. It is the responsibility of the biomedical personnel who maintain this device to determine test equipment equivalency.

TCP – Test Equipment Verification

All test equipment used to perform the TCP must have a current calibration label. The calibration label must be issued by a certified calibration facility.

TCP – Workstation Power

The AC line power to the workstation used must be connected to a grounded power source. The workstation must have Electrostatic Discharge (ESD) protection.

TCP – Personnel

Technicians who perform the PIP must be properly qualified and thoroughly familiar with the operation of the LIFEPAK 12 defibrillator/monitor, meeting the requirements described in **Service Personnel Qualifications**.

TCP – Test Equipment Requirements

You need the following test equipment, or equivalent, to conduct the TCP.

Equipment	Specifications	Manufacturer
Defibrillator Analyzer[1]	Energy range: 0 to 450 J Load resistance: 50 Ω ±1% Accuracy: ±2% +2 J Waveforms: NSR, VF, and Sine Wave	Fluke Biomedical - BIO-TEK® QED-6™, with test posts accessory (software version 2.07, or greater) or equivalent
QUIK-COMBO Test Post Adapter	Connects to QUIK-COMBO Therapy Cable	Medtronic MIN 3005302
AC Power Adapter	Input power: 120/230 vac, 50/60 Hz	Medtronic MIN 3010942
LIFEPAK NiCd Battery	NiCd battery with fuel gauge	Medtronic MIN 3009376
ECG Calibration Cable		Medtronic MIN 3012087-000

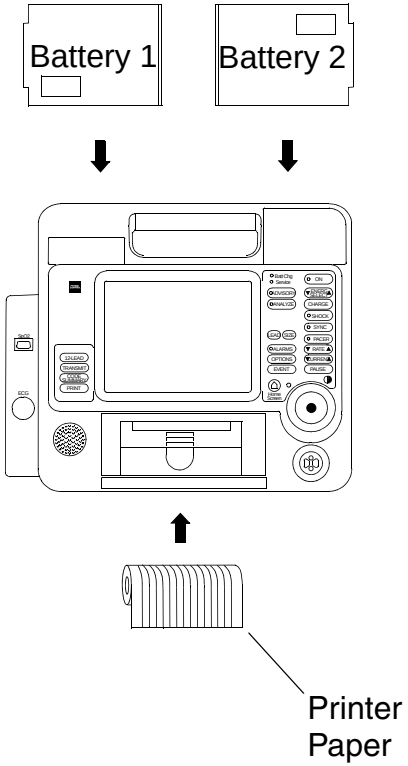
1. Some energy meters are not accurate for biphasic waveforms. For more information, contact your defibrillator analyzer's manufacturer .

(Continued on next page)

TCP – Test Equipment Requirements *(continued)*

Equipment	Specifications	Manufacturer
General Purpose Oscilloscope	Bandwidth: dc to 2 MHz Vertical accuracy: ±3% (5 mV – 5 v/div.) Horizontal Time Base Accuracy: ±5%	Fluke 192B or equivalent
CO2 Calibration Kit		Medtronic MIN 3012430-01
Calibration Gas	5% CO2, bal. N2	Medtronic MIN 3012556
CO2 Filter Line	XS-04667	Medtronic MIN 3012176
QUIK-COMBO Therapy Cable		Medtronic MIN 3006570
Standard Paddles		Medtronic MIN 3006228
Serial Data Cable		Medtronic MIN 3009817

TCP – Setup



The following describes the LIFEPAK 12 defibrillator/monitor setup for the TCP.

WARNING!

Shock hazard. When discharged during this TCP, the device discharges up to 360 J of electrical energy through the defibrillator cable. You must safely discharge this electrical energy as described in this TCP. Do not attempt to perform this procedure unless you are thoroughly familiar with the operation of the device.

To set up the LIFEPAK 12 defibrillator/monitor for the TCP:

1. Insert two fully functional batteries in the device. A functional battery is one that does not return a LOW BATTERY message when you turn on the device.
2. Verify that each battery clicked into position in the rear panel battery wells.
3. Install a roll of paper in the printer.

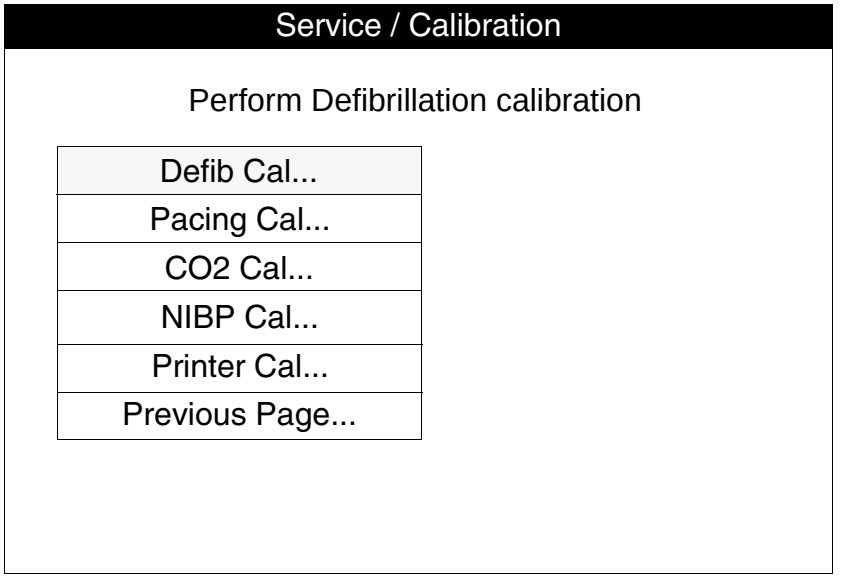
   Note: If the A12 Printer was replaced, save the piece of paper inside the printer that has the printhead resistance written down.

   Note: Do not connect anything to the therapy connector, except as directed during this procedure.

TCP – Service/Calibration Submenu Access

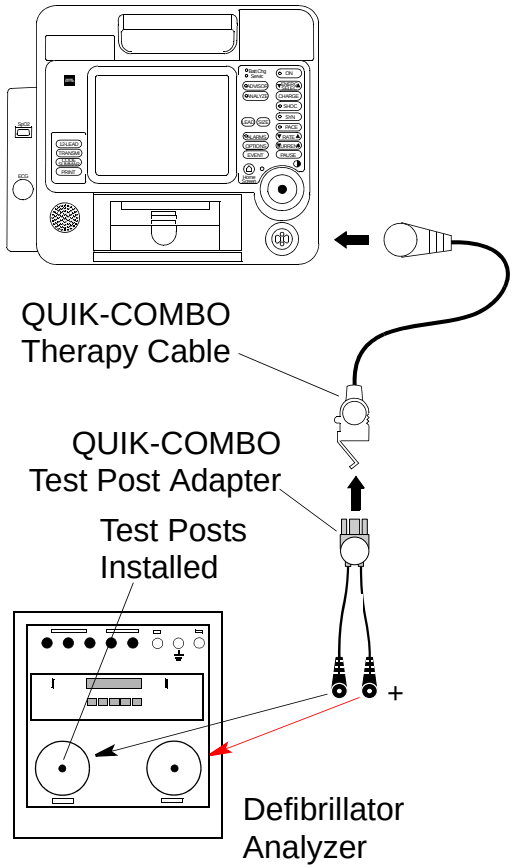
To enter the SERVICE/CALIBRATION submenu:

1. Conduct the procedure **TCP – Setup**.
2. Place the device in **service** mode.
3. Select CALIBRATION from the SERVICE menu to display the SERVICE/CALIBRATION submenu.



TCP – Defibrillator Calibration

Procedure for Biphasic Device



Use this procedure for a biphasic device.

To perform the defibrillator calibration procedure:

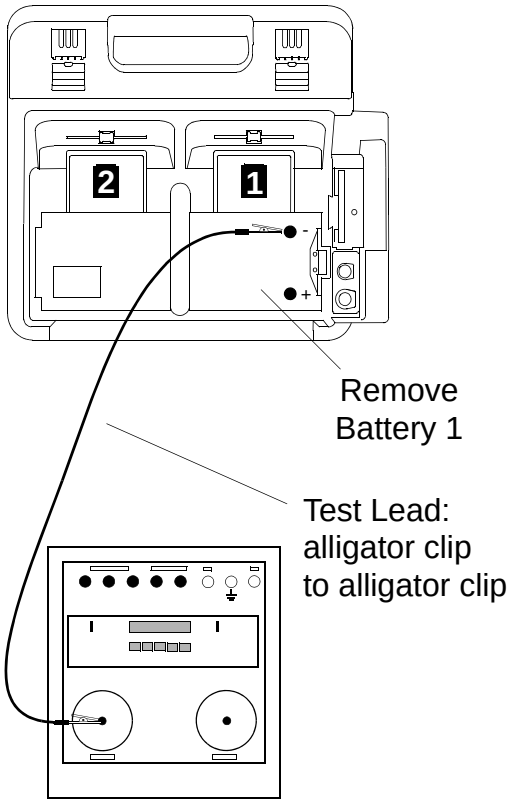
1. Connect the device to the defibrillator analyzer. Make sure the QUIK-COMBO (+) terminal is connected to apex (+).

   Note: Adapt this procedure to use standard paddles, if desired.

2. Set the defibrillator analyzer to measure energy, with the appropriate scale.
3. Access the **Service/Calibration** submenu.
4. Choose DEFIB CAL from the SERVICE/CALIBRATION submenu.
5. Select START to initiate the calibration routine.
6. Follow the instructions on the device screen.
7. Turn off the device.
8. Continue directly to **TCP – Defibrillator Isolation Test**.

TCP – Defibrillator Isolation Test

Use of Standard Paddles Required



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The Defibrillator Isolation Test with Standard Paddles is required if you remove or replace the high voltage wiring, A13 Transfer Relay Assembly, A14 Waveshaping Inductor or any biphasic circuitry on all devices.

WARNING!

Shock hazard. Electrical energy is discharged during this procedure. Do not allow the paddle electrodes to contact any person or conductive surfaces except as described below.

1. Establish the setup shown on this and the following page. Remove Battery 1.
2. Turn on the device.
3. Verify the defibrillator analyzer is on and the display displays ENERGY. If not, turn on the defibrillator analyzer and press the ENRG softkey.
4. Rotate the Sternum paddle ENERGY SELECT dial to select 360J.
5. Press the Apex paddle CHARGE button.
6. When the device is fully charged, place the Apex paddle on the defibrillator analyzer Apex (+) test pad while holding the Sternum paddle in open air.

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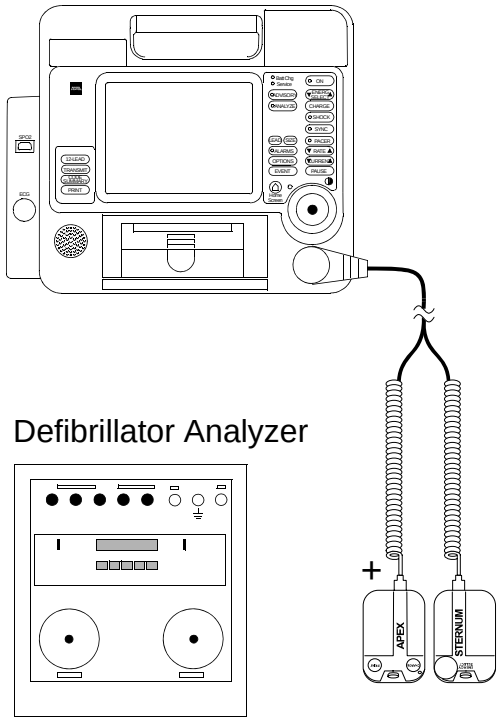
TCP – Defibrillator Isolation Test *(continued)*



7. Simultaneously press the paddles SHOCK switches to discharge the device.
8. Verify the defibrillator analyzer indicates a delivered energy of less than 18 joules.
9. Change the alligator clip lead to the other defibrillator analyzer test post.
10. Press the Apex paddle CHARGE button.
11. When the device is fully charged, place the Sternum paddle on the defibrillator analyzer Sternum (-) test pad while holding the Apex paddle in open air.
12. Simultaneously press the paddles' SHOCK switches to discharge the device.
13. Verify the defibrillator analyzer indicates a delivered energy of less than 18 joules.
14. Turn off the device.
15. Remove the test lead and reinstall Battery 1.
16. Continue directly to **TCP – Delivered Energy Test**.

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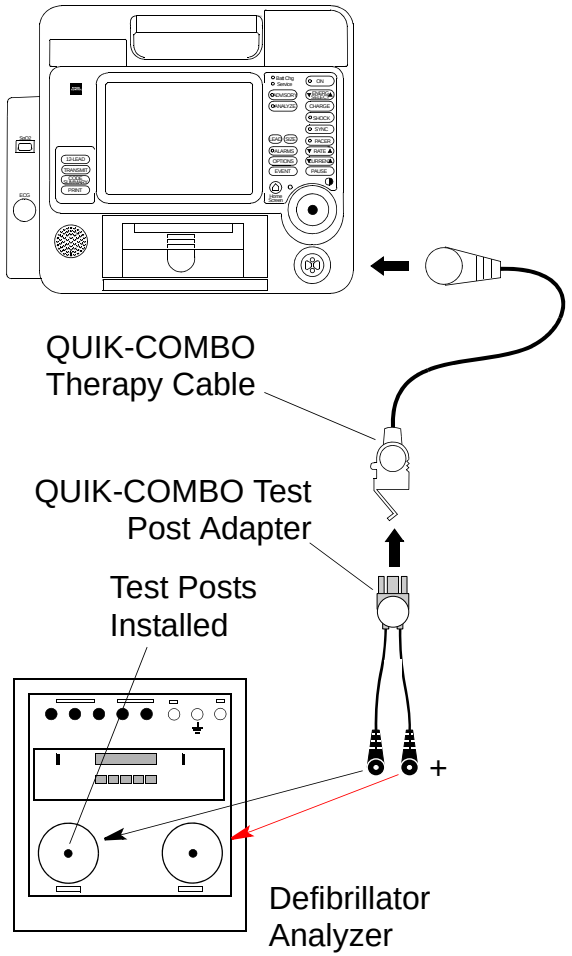
TCP – Delivered Energy Test



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WARNING!

Shock hazard. Avoid contact with the energy meter. Dangerous voltages will be present on energy meter electrode plates/posts.

To verify the defibrillator delivered energy:

1. Connect the device to the defibrillator analyzer. Make sure the QUIK-COMBO (+) terminal is connected to apex (+).

   Note: Adapt this procedure to use Standard Paddles, if desired.

2. Set the defibrillator analyzer to measure energy, with the appropriate scale.
3. Turn on the device. Verify that the ADVISORY indicator is off. If not, see **Entering Manual Mode**.
4. Press the ENERGY SELECT control to select 2J.
5. Press the CHARGE control and wait for the device to reach full charge. Press the SHOCK control to discharge the device energy.
6. Verify that the defibrillator analyzer shows an energy level between 1.0 and 3.0 joules.

   Note: Not all energy levels listed in the **Delivered Energy Test table** are available on every device.

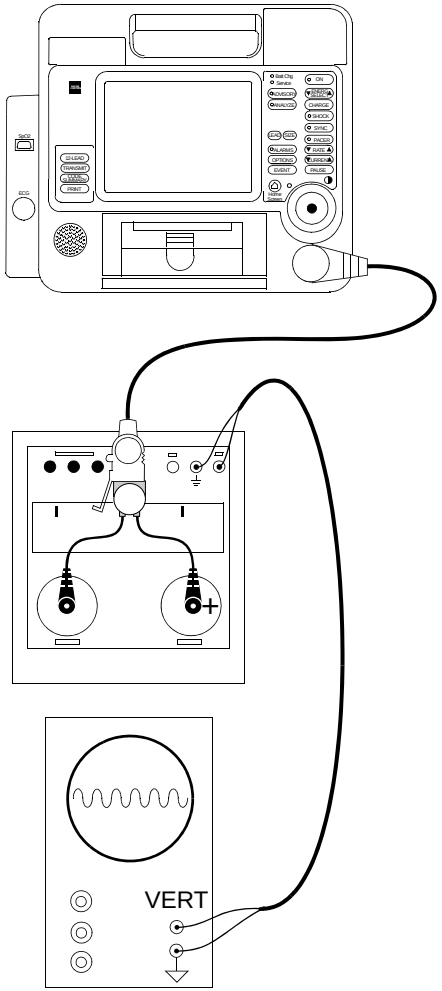
(Continued on next page)

TCP – Delivered Energy Test *(continued)*

7. Repeat steps 4 through 6 for the remaining available energy levels specified in the Delivered Energy Test table.

Energy Level (J)	Acceptable Output (J)	Energy Level (J)	Acceptable Output (J)
2	1.0 to 3.0	70	66.5 to 73.5
3	2.0 to 4.0	100	97.5 to 102.5
4	3.0 to 5.0	125	123.0 to 128.0
5	4.0 to 6.0	150	146.3 to 158.8
6	5.0 to 7.0	175	170.62 to 179.38
7	6.0 to 8.0	200	195.0 to 205.0
8	7.0 to 9.0	225	219.37 to 230.63
9	8.0 to 10.0	250	243.75 to 256.25
10	9.0 to 11.0	275	268.12 to 281.88
15	14.0 to 16.0	300	292.5 to 307.5
20	19.0 to 21.0	325	316.87 to 333.13
30	28.5 to 31.5	360	351.0 to 369.0
50	47.5 to 52.5		

TCP – Biphasic Defibrillator Output Waveform Test



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The Defibrillator Output Waveform Test is optional and is intended to aid in troubleshooting the A13 Transfer Relay Assembly or the A15 Energy Storage Capacitor. Use fully charged batteries when you perform this procedure.

1. Connect the device to a defibrillator analyzer using the QUIK-COMBO Therapy Cable. Set the defibrillator analyzer to ENERGY, 1000J scale.
2. Connect the DEFIB and GND terminals on the defibrillator analyzer to an oscilloscope vertical channel input and ground input. Set the oscilloscope to 0.5 V/div, 2 ms/div, + slope, store mode, and single sweep.

   Note: 1 V on the oscilloscope = 29 A defibrillator output current using the QED-6 energy meter. When using other energy meters, refer to the manufacturer's specifications. You may need to slow down the horizontal sweep and/or turn on the triggering high-frequency reject to successfully capture the waveform.
3. Turn on the device. Press the ENERGY SELECT control and select 360J.
4. Press the CHARGE control. After the capacitor charges (the SHOCK indicator is blinking), press the SHOCK control to deliver the energy to the analyzer.
5. Verify that the waveform meets specifications (see next page for biphasic device).
6. When testing is complete, turn off the device and disconnect the test setup.

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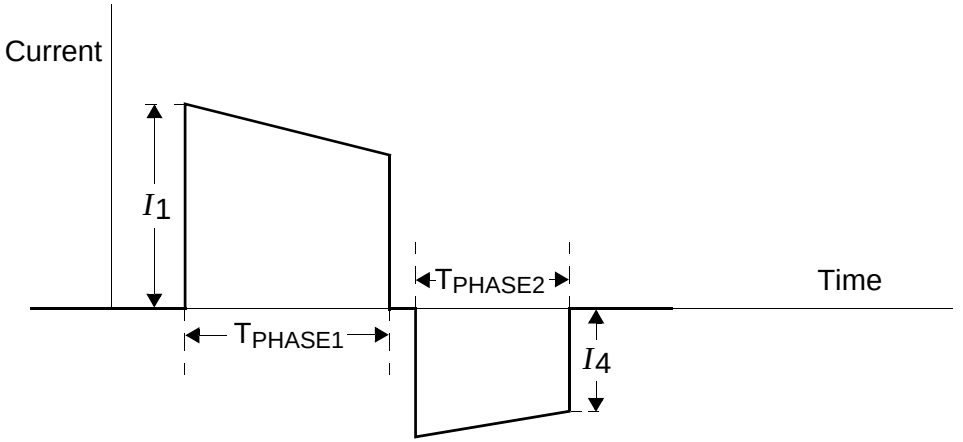
TCP – Biphasic Defibrillator Output Waveform Test *(continued)*



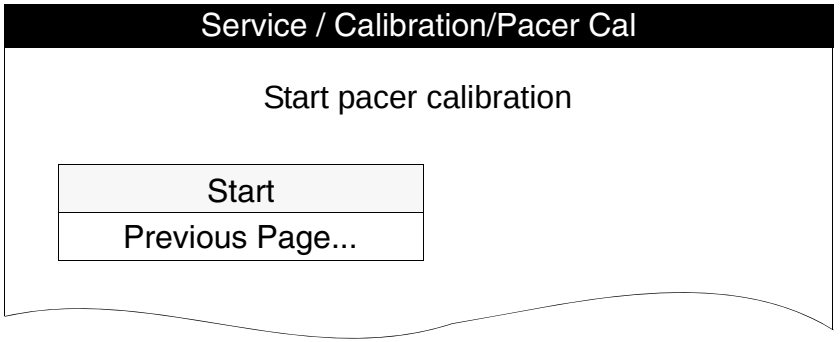
Patient Impedance (Ω)	T_{PHASE1} (ms)		T_{PHASE2} (ms)		Tilt	
	Min	Max	Min	Max	Min	Max
50	6.8	7.9	4.5	5.3	63.9	71.0

Note 1. Delivered waveform at 360 joules into given resistive load.
Note 2. Discharge polarity is APEX positive, STERNUM negative for Phase 1.
Note 3. Tilt $= \frac{(I_1 - |I_4|)}{I_1}$

TCP – Pacing Self-Calibration

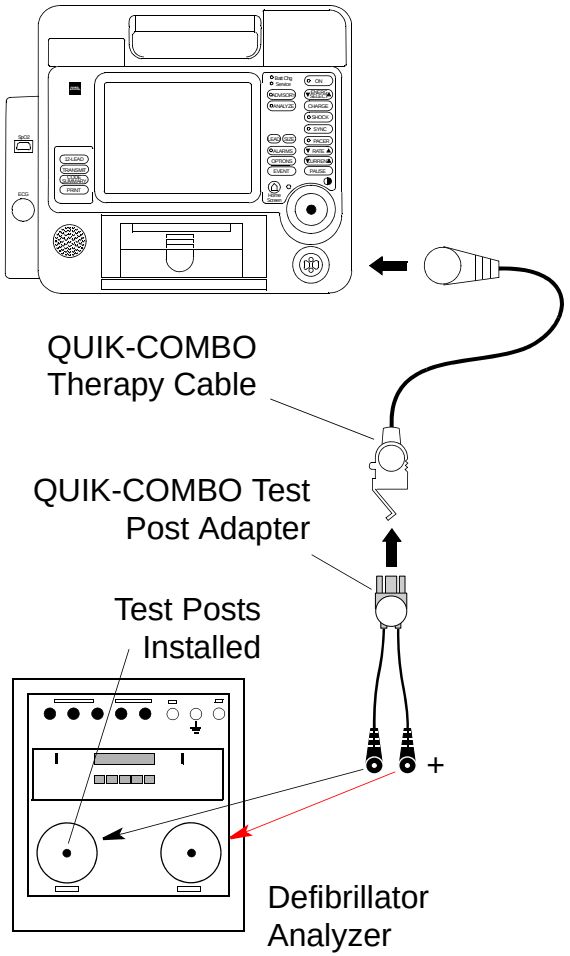
To perform the pacer self calibration procedure:

1. Disconnect all front panel cables from the device.
2. Access the **Service/Calibration** submenu.
3. Choose PACING CAL from the SERVICE/CALIBRATION submenu.
4. Select START to initiate the calibration routine from the SERVICE/CALIBRATION/PACER CAL overlay.



5. After about 60 seconds, the message CALIBRATION COMPLETE appears.
6. Turn off the device.
7. Continue directly to **TCP – Pacing Verification Test**.

TCP – Pacing Verification Test



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WARNING!

Shock hazard. Avoid contact with the energy meter. Potentially dangerous voltages will be present on energy meter electrode plates/posts.

To verify the pacer current levels (for devices equipped with pacing):

1. Connect the device to the defibrillator analyzer. Make sure the QUIK-COMBO (+) terminal is connected to apex (+).
2. Set the defibrillator analyzer for pacing measurements.
3. Turn on the device. Verify the ADVISORY indicator is off. If not, see **Entering Manual Mode**.
4. Press the PACER control to activate pacing.
5. Press the CURRENT control, then use the Selector to select a current of 10 mA. Verify the measured pacer current is between 5 and 15 mA.
6. Repeat step 5 for the remaining pacer current levels specified in the **Pacer Current Test table** (next page).

Note: Press the CURRENT control, as required, to maintain the CURRENT overlay on the screen.

(Continued on next page)

TCP – Pacing Verification Test *(continued)*

Set Current (mA)	Output (mA)	Set Current (mA)	Output (mA)	Set Current (mA)	Output (mA)
10	5 to 15	75	70 to 80	140	133.0 to 147.0
15	10 to 20	80	75 to 85	145	137.7 to 152.3
20	15 to 25	85	80 to 90	150	142.5 to 157.5
25	20 to 30	90	85 to 95	155	147.2 to 162.8
30	25 to 35	95	90 to 100	160	152.0 to 168.0
35	30 to 40	100	95 to 105	165	156.7 to 173.3
40	35 to 45	105	99.7 to 110.3	170	161.5 to 178.5
45	40 to 50	110	104.5 to 115.5	175	166.2 to 183.8
50	45 to 55	115	109.2 to 120.8	180	171.0 to 189.0
55	50 to 60	120	114.0 to 126.0	185	175.7 to 194.3
60	55 to 65	125	118.7 to 131.3	190	180.5 to 199.5
65	60 to 70	130	123.5 to 136.5	195	185.2 to 204.8
70	65 to 75	135	128.2 to 141.8	200	190.0 to 210.0

TCP – ECG Calibration

Applicability

This procedure applies only to LIFEPAK 12 defibrillator/monitors with operating system software MIN 3011371-022 or later installed. Do not perform ECG calibration on devices equipped with previous operating system versions. If in doubt regarding the software version of your defibrillator/monitor, press the ON button to turn device power off, then press the ON button again, and note the software version displayed on the copyright screen.

Installing the ECG Calibration Software

To install the ECG calibration software on your computer:

1. Open the LP12ECG CAL folder on the LIFEPAK 12 Defibrillator/Monitor Service Manual CD.
2. Double-click the SETUP.EXE file.

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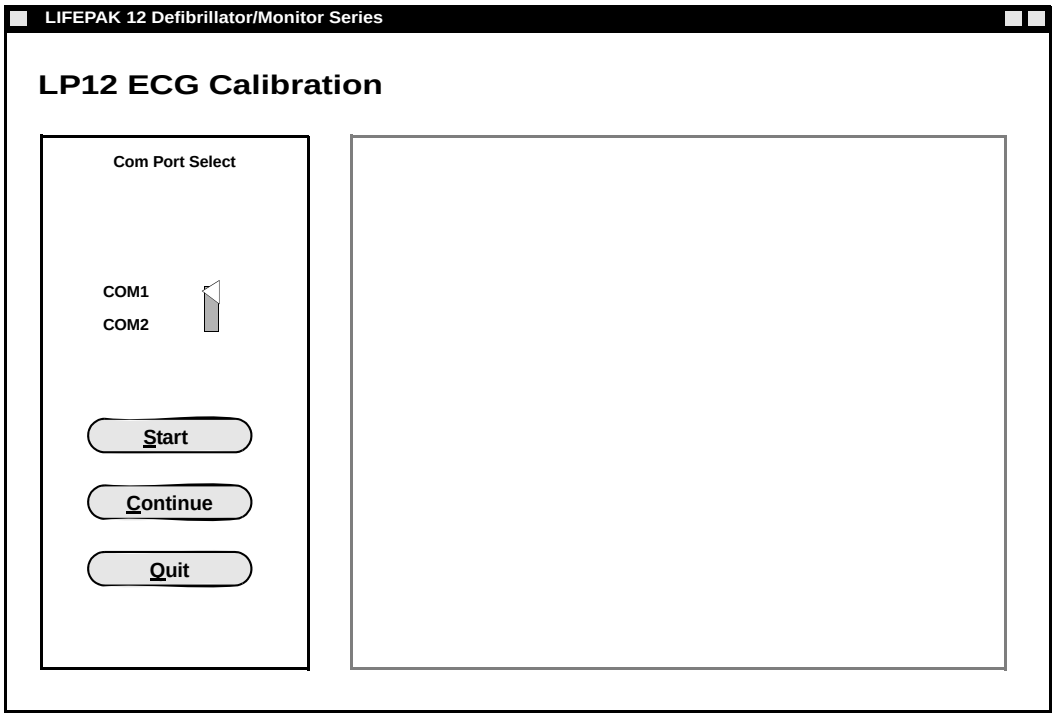
TCP – ECG Calibration *(continued)*

ECG Calibration Procedure

To perform the ECG calibration procedure:

1. Open the LP12EGCCAL application. The following screen displays.



2. Click START and follow the instructions on the screen to perform ECG calibration.

(Continued on next page)

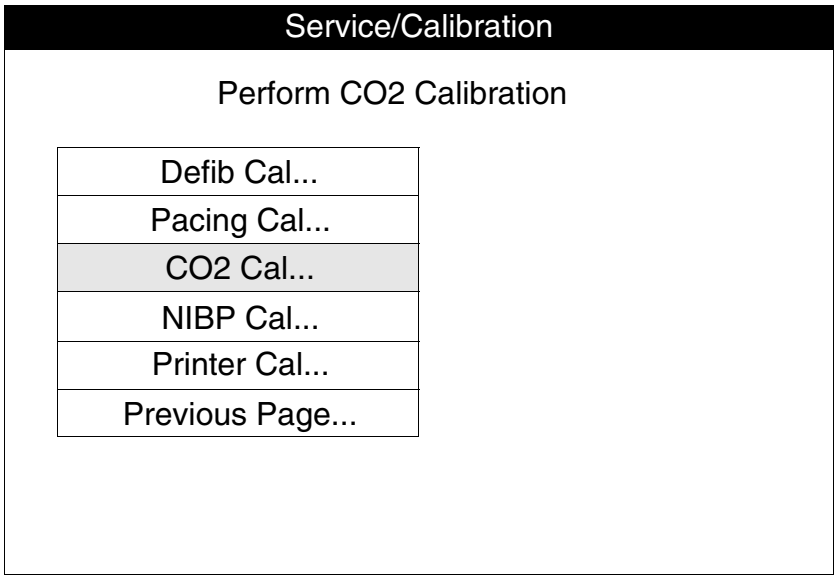
TCP – EtCO2 Calibration

To calibrate the ETCO2 module:

Note: Allow 20 minutes from initial power on for the device to warm up before proceeding with the calibration of the EtCO2 module.

1. Access the SERVICE/CALIBRATION submenu by selecting CALIBRATION from the SERVICE menu.

2. Select CO2 CAL....



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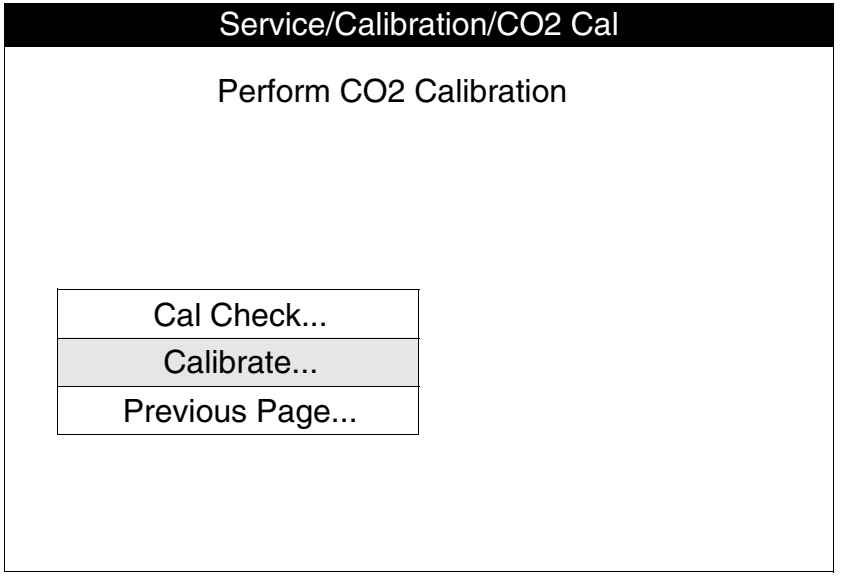
TCP – EtCO2 Calibration *(continued)*

To initiate CO2 calibration:

Select CALIBRATE . . . from the SERVICE/CALIBRATION/CO2 CAL submenu.



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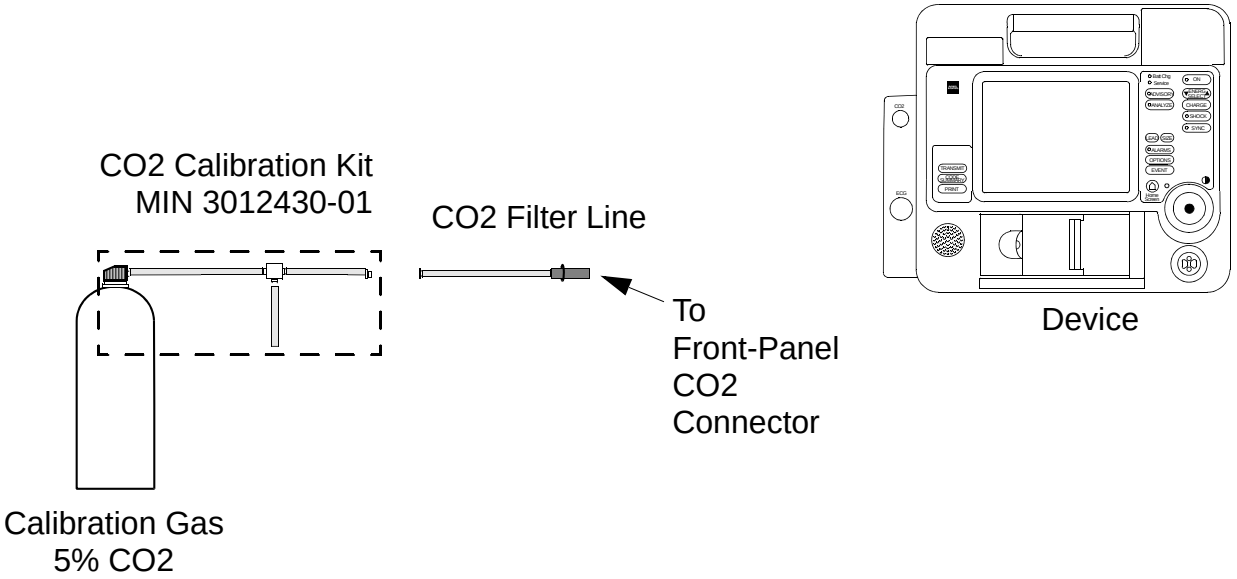
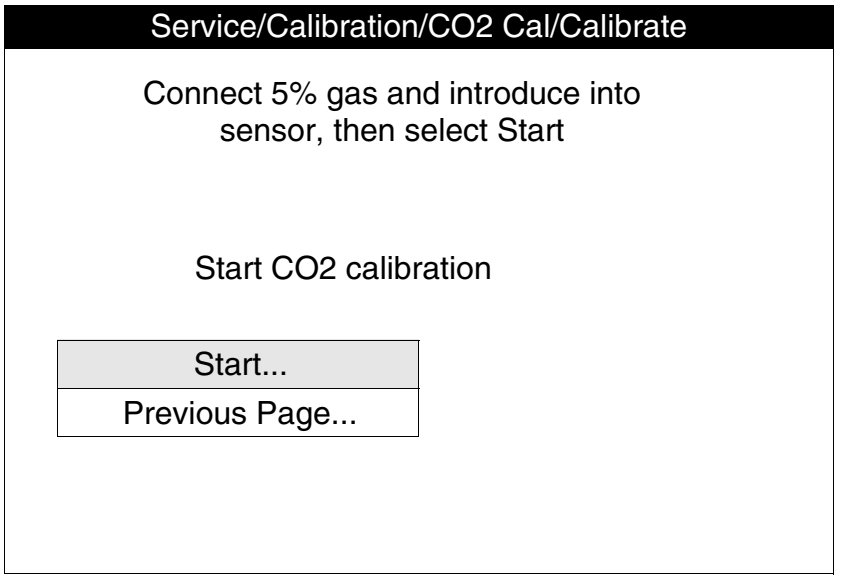
TCP – EtCO2 Calibration *(continued)*

Connect the calibration gas canister to the front panel CO2 connector using a standard CO2 Filter Line and the CO2 calibration kit.



TCP – EtCO2 Calibration *(continued)*

1. Press and hold the spray nozzle to apply calibration gas.
2. Select START.... Verify that the display reads CALIBRATION IN PROGRESS . . . .



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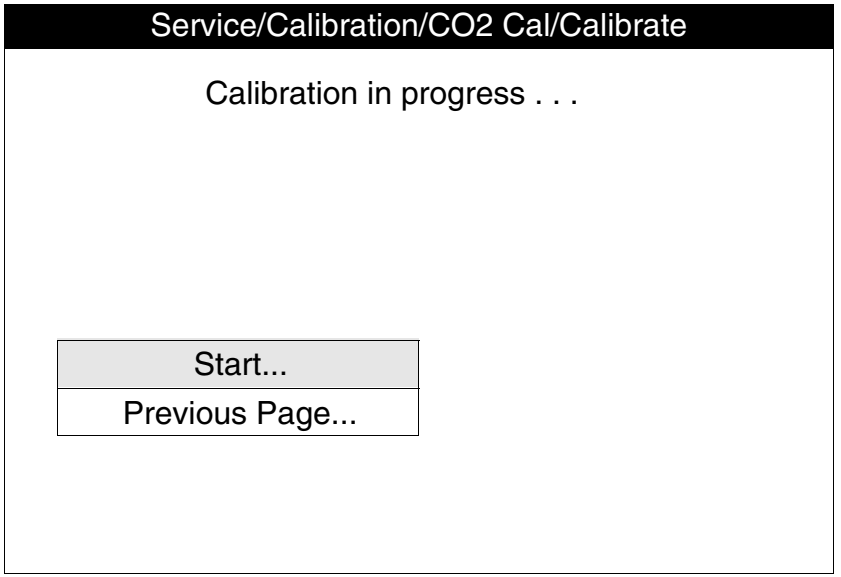
TCP – EtCO2 Calibration *(continued)*

1. Hold the spray nozzle down. When the DISCONNECT GAS prompt appears, release the spray nozzle.

   Note: Do not disconnect the filter line until the CALIBRATION OK message appears.

2. Verify that the message CALIBRATION OK appears. If CALIBRATION FAILED appears, the LIFEPAK 12 defibrillator/monitor logs a service error code, and the SERVICE indicator illuminates.



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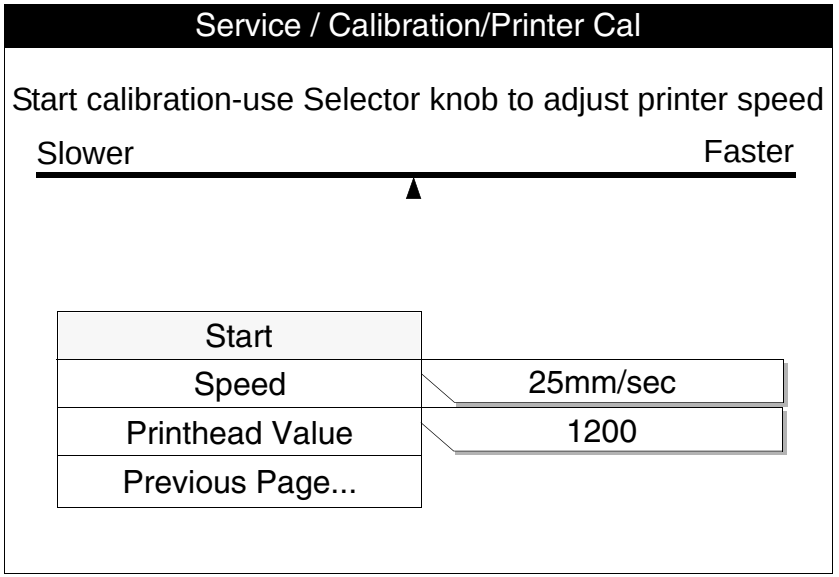
TCP – Printer Calibration

To perform the printer calibration procedure:

1. Disconnect all front panel cables from the device.
2. Access the **Service/Calibration** submenu.
3. Choose PRINTER CAL from the SERVICE/CALIBRATION submenu.



TCP – Printer Calibration *(continued)*

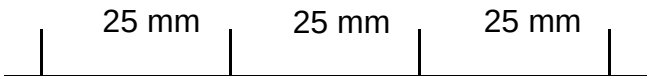
4. If you changed the A12 Printer and are calibrating a new printer, go to step 5. If you are calibrating an existing printer, go to step 6.

5. Select PRINTHEAD VALUE. Rotate the Selector to match the printhead resistance recorded for this printer, then press the Selector.

   Note: If you failed to record the printhead resistance value or cannot find the value, see the **A12 Printer Replacement** procedure to remove the printer, locate the resistance value, and then reinstall the printer.

6. Select START, then push the Selector. The printer runs and prints horizontal tick marks.

7. Notice the spacing of the printed tick marks. The correct interval between marks is 25 mm. Use the Selector to adjust the printer speed SLOWER or FASTER.



8. When the marks are spaced at 25 mm, press the Selector to stop printing.

9. Turn off the device.

Troubleshooting

The Troubleshooting section describes Error Code usage, interpretation, and corrective action. It includes a separate Troubleshooting Chart keyed to the Performance Inspection Procedures (PIP) and individual troubleshooting tests that require operator interpretation. Choose from the following topics:

(Continued on next page)

Troubleshooting

(continued)

Troubleshooting Chart

Area	Observed Symptom	Suggested Corrective Action
Physical Inspection	Loose or broken hardware	Locate and tighten or replace loose items. Locate and replace broken components.
	Evidence of dirt, fluids, or foreign objects	**Perform External Cleaning**.
	Damaged keypad or label	**Replace A09 Small Keypad**. **Replace A10 Large Keypad**. **Replace Bezel Label (158)**. **Replace Product Identification Label (162)**. **Replace Explosion/Hazard Label (164)**. **Replace Operating Instruction Label (170)**.
	Damaged battery pin(s)	**Replace battery pin(s)**.
Power On/Self Test	No power on	Install fully charged, properly maintained batteries. Check or **replace battery pin(s)**. Check or **replace A03 Power PCB**.
	SERVICE indicator remains on	Refer to **Processing Error Codes** for assistance.
	MAINTENANCE DUE indicator remains on	Perform Setting the Maintenance Prompt interval. Perform Resetting the Maintenance Prompt interval.

(Continued on next page)

Troubleshooting Chart *(continued)*

Area	Observed Symptom	Suggested Corrective Action
LCD Display	Improper LCD response	Perform **Pixels Test**. Check or **replace A11 LCD Assembly**. Check or **replace A01 System PCB**.
EL Display	Improper EL response	Perform **Pixels Test**. Check or **replace A11 EL Assembly**. Check or **replace A01 System PCB**.
Keypanels	Improper key response	Check or **replace A09 Small Keypad**. Check or **replace A10 Large Keypad**. Check or **replace A05 Interface PCB**. Check or **replace A01 System PCB**.
Printer	Missing dots in printed “X”	Verify use of proper printer paper. Clean the printhead (50 mm or 100 mm printer). Check or **replace A12 Printer Assembly**.
	One or more horizontal lines missing or distorted	Check or **replace A01 System PCB**.

(Continued on next page)

Troubleshooting Chart *(continued)*

Area	Observed Symptom	Suggested Corrective Action
Printer	Missing or broken characters	Verify use of proper paper. Clean the printhead (50 mm or 100 mm printer). Check or **replace A12 Printer Assembly**. Check or **replace A01 System PCB**.
	Improper 25 mm marker spacing	Perform the **Printer Calibration**.
	CHECK PRINTER screen message appears	Perform **Paper Sensor Cleaning**. Verify that the **printer paper is correctly loaded**. Check or **replace A12 Printer Assembly**.
Audio	Inaudible or garbled audio	Check or **replace the W17 Speaker Assembly**. Check or **replace the A05 Interface PCB**. Check or **replace the A01 System PCB**.
Power Source Management		Verify instructions and retry test. Substitute another battery and retry test. Check or **replace battery pin(s)**. Check or replace test battery. Check or replace the AC Power Adapter. Check or replace **A03 Power PCB**. Check or replace **A03 Power PCB Fuses.**

Troubleshooting Chart *(continued)*

Area	Observed Symptom	Suggested Corrective Action
QUIK-COMBO or Standard Paddles Delivered Energy	No energy discharge	Verify test setup and retry test. Refer to **Processing Error Codes** for assistance. Check or replace Therapy Cable or Standard Paddles. Check or **replace W11 Therapy Connector Cable**. Check or **replace A04 Therapy PCB**. Check or **replace A22 Biphasic Module PCB**. Check or **replace A13 Transfer Relay Assembly**. Check or **replace A14 Inductive Resistor** (Biphasic). Check or **replace A14 Waveshaping Inductor**. Check or **replace A15 Energy Storage Capacitor**.
	Delivered energy out of tolerance	Perform **Defibrillator Self Calibration**.
QUIK-COMBO Impedance Sense	Inappropriate screen message response	Verify test setup and retry test. Check or replace Therapy Cable. Check or **replace W11 Therapy Connector Cable**. Check or **replace A04 Therapy PCB**.

(Continued on next page)

Troubleshooting Chart *(continued)*

Area	Observed Symptom	Suggested Corrective Action
Standard Paddles Defibrillation Isolation	Measured energy exceeds 18 joules	Verify test setup and retry test. Check internal high voltage wire routing; repair as necessary. Check internal high voltage wire connections; repair as necessary.
QUIK-COMBO or Standard Paddles Synchronous Cardioversion	No Sync mark	Verify test setup and retry test. Adjust ECG size. Check or **replace A01 System PCB**.
	Failure to transfer coincident with Sync mark	Take device out of Sync and try to discharge. Perform **Keypad Test**. Check or replace standard paddles.
User Test	Service indicator illuminates, User Test fails	Cycle device power - repeat User Test. If an AC Power Adapter is in use, wait 2 seconds after disconnecting from line power, turn device on and repeat User Test. Access Error Log, and clear Error codes.
	Sync discharge time exceeds 60 ms	Verify test setup and retry test. Check or **replace A01 System PCB**.

(Continued on next page)

Troubleshooting Chart *(continued)*

Area	Observed Symptom	Suggested Corrective Action
Pacer Option Characteristics	Inappropriate screen message or alarm response	Verify test setup and retry test. Check or replace Therapy Cable. Check or replace ECG Cable. Check or **replace W11 Therapy Connector Cable**. Check or **replace W07 ECG Connector Cable**. Check or **replace A10 Large Keypad**. Check or **replace A04 Therapy PCB**.
	Peak current levels out of tolerance	Perform **Pacing Self Calibration**.
	Pacer pulse width out of tolerance	Check or **replace A04 Therapy PCB**.
No Pacer Option Characteristic	Inappropriate screen message response	Check or **replace A04 Therapy PCB**.
12-Lead ECG Characteristics	Inappropriate screen message response	Verify test setup and retry test. Check or replace ECG Cable. Check or **replace W07 ECG Connector Cable**. Check or **replace A09 Small Keypad**.

(Continued on next page)

Troubleshooting Chart *(continued)*

Area	Observed Symptom	Suggested Corrective Action
12-Lead ECG Characteristics	ECG gain out of tolerance	Verify test setup and retry test. Check or replace ECG Cable. Check or **replace A01 System PCB**.
3-Lead ECG Characteristics	Inappropriate screen message response	Verify test setup and retry test. Check or replace ECG Cable. Check or **replace W07 ECG Connector Cable**. Check or **replace A09 Small Keypad**.
	ECG gain out of tolerance	Verify test setup and retry test. Check or replace ECG Cable. Check or **replace A01 System PCB**. Check or **replace A04 Therapy PCB**.
QUIK-COMBO ECG Characteristics	ECG gain out of tolerance	Verify test setup and retry test. Check or replace Therapy Cable. Check or **replace A04 Therapy PCB**. Check or **replace A01 System PCB**.
	ECG fast restore out of tolerance	Verify test setup and retry test. Check or replace Therapy Cable. Check or **replace A01 System PCB**.

(Continued on next page)

Troubleshooting Chart *(continued)*

Area	Observed Symptom	Suggested Corrective Action
Standard Paddles ECG Characteristics	ECG gain out of tolerance	Verify test setup and retry test. Check or replace standard paddles. Check or **replace A04 Therapy PCB**. Check or **replace A01 System PCB**.
	ECG fast restore out of tolerance	Verify test setup and retry test. Check or replace standard paddles. Check or **replace A04 Therapy PCB**.
ECG Analog Output	Output waveform missing or out of tolerance	Verify test setup and retry test. Check or replace Analog ECG Output Cable. Check or **replace W08 System Connector Cable**. Check or **replace A01 System PCB**.
Oximeter	Saturation reading missing or out of tolerance	Verify test setup and retry test. Retry test with another test subject. Check or replace SpO2 finger probe. Check or **replace W22 SpO2 Connector Cable**. Check or **replace A16 SpO2 Module**. Check or **replace A06 OEM PCB**.

(Continued on next page)

Troubleshooting Chart *(continued)*

Area	Observed Symptom	Suggested Corrective Action
PC Card	Inappropriate screen message response	Verify test setup and retry test. Try another PC Card. Check or **replace W14 System PCB/PC Card Slot Cable**. Check or **replace A01 System PCB**.
Fax Transmission	Unable to complete fax transmissions	Verify that the 3Com® Megahertz 56K Modem card is installed. In the setup\transmission\Fax\Ports\Internal cell fax screen, enter initialization string AT&F6E0V1 under edit string 1.
NIBP Monitor	NIBP monitor displays XXX in the NIBP region of the display with the SERVICE indication OFF	Perform NIBP leakage test. Check or **replace A21 NIBP module**.
	NIBP monitor displays XXX in the NIBP region of the display with the SERVICE indication ON	Check tubing between the NIBP connector and NIBP module for kinks or occlusions. Check or **replace A21 NIBP module**.

(Continued on next page)

Troubleshooting Chart *(continued)*

Area	Observed Symptom	Suggested Corrective Action
EtCO2 Monitor	CO2 monitor fails calibration	Verify test setup and retry test. Check to see if CO2 calibration gas canister is empty. Check FilterLine to see if it is disconnected. Check or **replace A23 CO2 module**.
	CO2 monitor displays FilterLine Blockage message	Replace FilterLine. Check input tubing between CO2 connector and CO2 module for kinks or occlusions. Check or **replace A23 CO2 module**.
	CO2 monitor displays XXX in the CO2 region of the display with SERVICE indicator OFF	Perform EtCO2 calibration. Check or **replace A23 CO2 module**.
	CO2 displays XXX in the CO2 region with SERVICE indicator ON	Check that the CO2 exhaust port is not blocked. Check exhaust tubing between CO2 module and CO2 exhaust port for kinks or occlusions. Check or **replace A23 CO2 module**.

(Continued on next page)

Troubleshooting Chart *(continued)*

Area	Observed Symptom	Suggested Corrective Action
Leakage Current	Device fails chassis leakage test	Verify instructions, setup, test leads, and retry test. Check source of ac line power. Check or replace AC Power Adapter. Check, repair, or restore proper internal wire routing.
	Device fails earth leakage test	Verify instructions, setup, test leads, and retry test. Check source of ac line power. Check or replace AC Power Adapter. Check, repair, or restore proper internal wire routing.
	Device fails source leakage test	Verify instructions, setup, test leads, and retry test. Check source of ac line power. Check or replace AC Power Adapter. Check, repair, or restore proper internal wire routing.
	Device fails sink leakage test	Verify instructions, setup, test leads, and retry test. Check source of ac line power. Check or replace AC Power Adapter. Check, repair, or restore proper internal wire routing.

Using the Service/Status Features

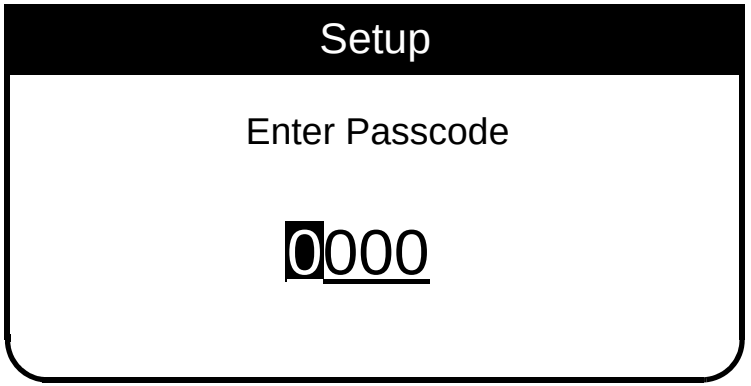
Introduction

The device includes a series of service/status screens and menus that detail device data such as stored manufacturing data, recorded errors, and counters for shock and pacing operation.

Displaying the SERVICE/STATUS Menu

To display the SERVICE/STATUS menu:

1. Hold down both the OPTIONS and EVENT controls, and then turn on the device. Continue holding until the SETUP Passcode overlay appears.



2. Enter the passcode 5433 by rotating the Selector to select a digit, and then press the Selector to continue. After the last digit is entered, the SETUP menu appears.

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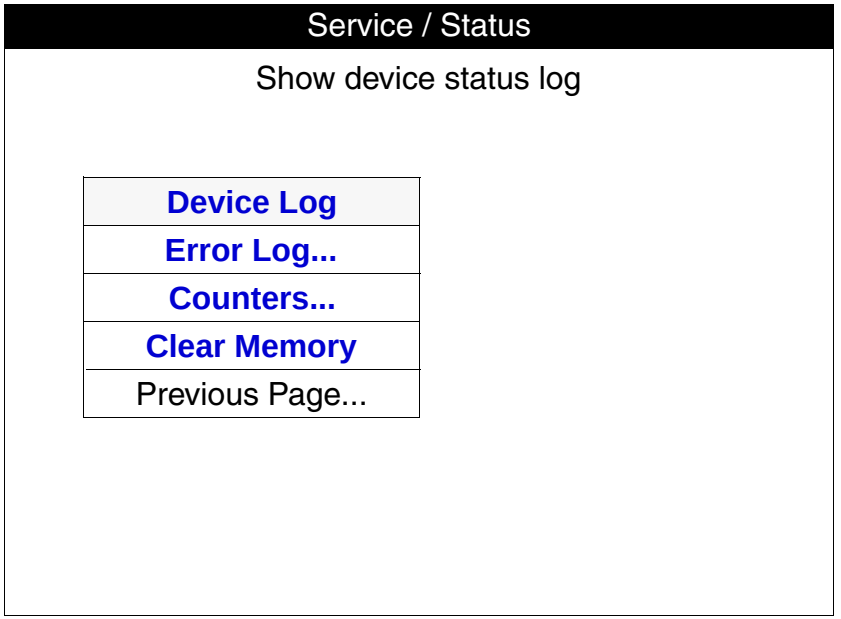
Using the Service/Status Features *(continued)*

Displaying the SERVICE/STATUS Menu (continued)

3. Rotate the Selector to select SERVICE on the SETUP menu, and then press the Selector. The SERVICE Passcode overlay appears. Enter the passcode 5433.
4. Rotate the Selector to select STATUS, and then press the Selector to display the SERVICE/STATUS menu.
5. Select the desired topic from the SERVICE/STATUS menu.



About the Device Log

Introduction

The Device Log displays essential device characteristics, such as the serial number, and accumulative device operations, such as the shock count.

Displaying the Device Log

To display the Device Log:

1. Display the SERVICE/STATUS menu.
2. Using the Selector, navigate to SERVICE/STATUS/DEVICE LOG.

Service / Status / Device Log	
Serial Number	8244381
Dash Number	(not used)
Manufacturing Date	18 Aug 99
Software Revision	3011371-000
Fault Messages	No
Power Cycle Count	558
Pacing Count	4112
Shock Count	739
Power On Time	74.2
Printer On Time	1.4
SpO2 Operating Time	10.5
Defib Storage Cap Value	52uF
CO2 Operating Time	1.0
NIBP Inflation Cycles	50
Press Selector knob to exit	

For monophasic only

(Continued on next page)

About the Device Log *(continued)*

Device Log Entries

Each entry in the Device Log is described below.

- Serial Number – Records the serial number that is stored in the device. If the serial number is blank, the device has lost important configuration data. Refer to **Verifying the Configuration Data**. If this serial number does not agree with the serial number on the device label in Battery Well 1, you have a device manufactured before April 30, 1998, after which the label serial number and the stored serial number were brought into alignment.
- Dash Number – (Not used.)
- Manufacturing Date – Records the date when the device was manufactured, specifically, when the operating software was loaded. If the manufacturing date is recorded as 01 Jan 1970, either the device configuration data has been lost (refer to **Verifying the Configuration Data**) or you have a device manufactured before March 21, 1998.
- Software Revision – Records the current version of the device operating software. The number 3011371 is fixed, while the three-digit extension number changes with each software version.
- Fault Message – Records YES or NO to whether there are any error codes stored in the Error Code Log. (Refer to **Processing Error Codes**.)

(Continued on next page)

About the Device Log *(continued)*

Device Log Entries (continued)

- Power Cycle Count – Records the number of times the device has been turned on.
- Pacing Count – Records the total pacing pulses delivered by the device.
- Shock Count – Records the total times the device defibrillation capacitor has been charged.
- Power On Time – Records the total device power-on time.
- Printer On Time – Records the total printer running time.
- SpO2 Operating Time – Records the total SpO2 running time.
- CO2 Operating Time – Records the total CO2 running time.
- NIBP Inflation Cycles – Records the total number of inflation cycles.
- Defib Storage Cap Value (monophasic only)– Records the calculated value of the defibrillation capacitor. This value is calculated by the device when you complete the **TCP — Defibrillator Self Calibration** procedure. The nominal value is 52 uF. If the calculated value of the defibrillation capacitor is below calibration levels, the device will not calibrate and an error message appears on the screen. This is an indication to replace the capacitor. Refer to the **A15 Energy Storage Capacitor Replacement** procedure.

About the Error Log

Introduction

The device operating software is designed to detect and report any improper operation or device malfunction by using a system of error codes. When an error condition is detected, the device writes a specific 4-digit hexadecimal number into the device Error Code Log – 500e for example – and then lights the front panel SERVICE indicator. The lighting of the SERVICE indicator is your signal to examine the Error Code Log and process any reported errors.

Displaying the Error Code Log

To display the Error Code Log:

1. Display the SERVICE/STATUS menu.
2. Using the Selector, navigate to SERVICE/STATUS/ERROR LOG.
3. Proceed or return to **Processing Error Codes**.

Clearing the Error Code Log

To clear the Error Code Log:

1. Display the SERVICE/STATUS menu.
2. Using the Selector, navigate to SERVICE/STATUS/ERROR LOG.
3. Use the Selector to choose CLEAR LOG.
4. Turn off the device or navigate to other service topics, as required.

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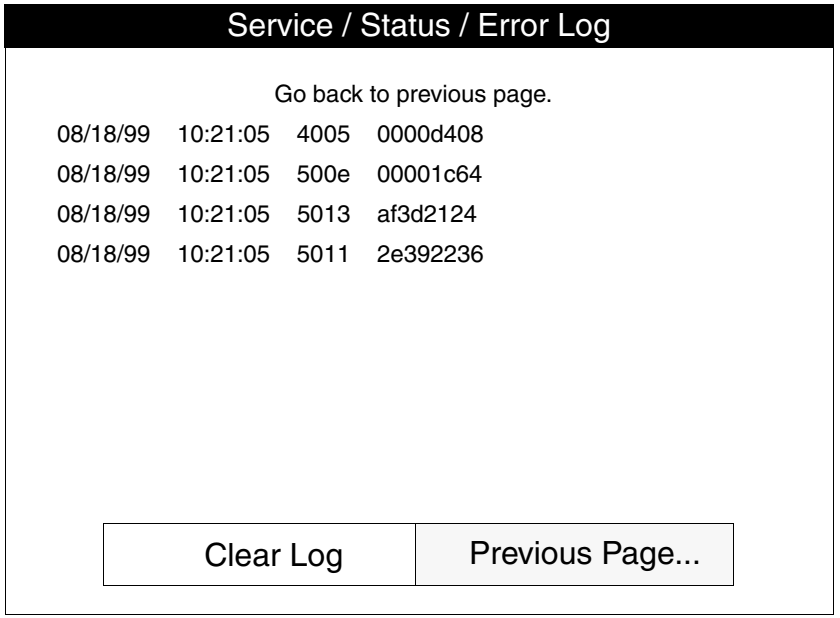
About the Error Log *(continued)*

How Error Codes are recorded in the Error Log

The SERVICE/STATUS/ERROR LOG displays errors by date, time, error, and error extension. For example, you might see the following errors when you review recorded errors (refer to **Processing Error Codes**):



Error Code extensions, for example 0000d408, indicate information regarding the error. This might include a memory address, coded response, or similar indication. Error Code extensions are defined for the a017 and a018 error codes because the extensions are fixed. For other errors, the extensions are variable.

About Counters

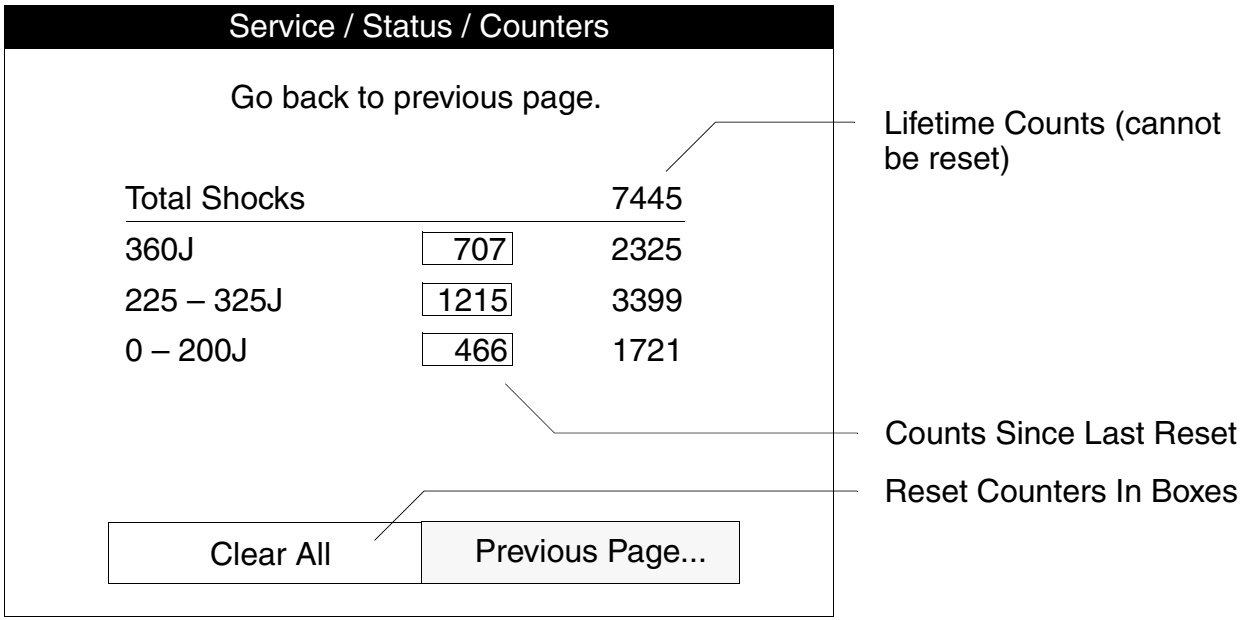
Introduction

The device counters display the number of shocks delivered in both subtotal and running-total counts.

Displaying the Counters

To display the counters:

1. Display the SERVICE/STATUS menu.
2. Using the Selector, navigate to: SERVICE/STATUS/COUNTERS.



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About Counters *(continued)*

Understanding the Counters

The SERVICE/STATUS/COUNTERS screen shows the following counters:

- Total Shocks – This is a running total of all the shocks ever delivered by the device. This counter cannot be reset.
- 360J Shocks – The boxed number represents the number of 360-joule shocks delivered since the last reset. The unboxed number is a running total of all 360-joules shocks ever delivered by the device (cannot be reset).
- 225 – 325J Shocks – The boxed number represents the number of 300-joule shocks delivered since the last reset. The unboxed number is a running total of all 300-joule shocks ever delivered by the device (cannot be reset).
- 0 – 200J Shocks – The boxed number represents the number of 200-joule, or less, shocks delivered since the last reset. The unboxed number is a running total of all ≤200-joule shocks ever delivered by the device (cannot be reset).

Resetting the Counters

With the SERVICE/STATUS/COUNTERS screen displayed, rotate the Selector to CLEAR ALL and press the Selector. This resets the boxed subtotal counters, but not the running-total counters. You can also reset the counters using the **Clear Memory** feature.

About Clear Memory

Introduction

The Clear Memory feature is used to clear the FLASH data management memory on the A02 Memory PCB. Specifically, you clear:

- ECG Data – All stored ECG data (up to 45 minutes of First-In-First-Out continuous ECG waveforms) is permanently deleted.
- Patient Reports – All stored patient reports are permanently deleted.

Normally you clear the data management memory after the device is placed into new or different use, and the old patient data is no longer required. You also clear the data management memory as part of some service actions.

Note: To save important patient data before clearing the data management memory, transmit the data to a receiving device or print out individual patient data (refer to the **operating instructions – Data Management**).

Clearing the Data Management Memory

To clear the Data Management Memory (this is permanent; there is no undo):

1. Display the SERVICE/STATUS menu.
2. Rotate the Selector to CLEAR MEMORY and press. A countdown timer appears to indicate the clearing process, which requires a nominal 30 seconds.

Processing Error Codes

Introduction

The LIFEPAK 12 defibrillator/monitor logs an error code and lights the SERVICE indicator whenever an internal program or process fails to execute properly. Errors rarely occur and should be investigated thoroughly by qualified service personnel before a device that displayed an error code is placed back into active use. Always complete the **Performance Inspection Procedure (PIP)** after encountering and clearing any error code(s).

Error codes stored in the Error Code Log may not necessarily indicate a permanent error. Error codes can indicate transient electromagnetic interference (EMI) or electrostatic discharge (ESD). If you suspect transient EMI or ESD as the source of an error, **Clear Error Code(s)**, then shut down and restart the device. If the error code does not recur, it may be the result of EMI or ESD.

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Processing Error Codes *(continued)*

Processing a Specific Error Code

To process an Error Code:

1. Review error codes by **Displaying the Error Code Log**. Record any errors, including the date, time, error, and error extension.
2. Use the Selector to choose CLEAR LOG, and then turn off the device.
3. Complete the **Performance Inspection Procedure (PIP)**. If it completes successfully, go to Step 4. If the SERVICE indicator lights at any time during the PIP, stop the PIP and continue to Step 5.
4. By virtue of passing the PIP, the device may be returned to regular use. The error code(s) may have been related to EMI or ESD. If the errors repeat, continue this procedure starting at Step 5.
5. Compare your PIP failure with the **Troubleshooting Chart**. Review the error codes against the **Error Code Categories** for general information and the **Error Code Table** for a corresponding corrective action. Service the device based on these inputs, and then repeat the **PIP**.
6. For persistent error codes, contact your local Medtronic service or sales representative.

Error Code Categories

Error codes are organized in 14 categories in 4-digit hexadecimal format:

Initial Digit	Category	Description	Associated PCBs and Assemblies
0xxx	UT	Utilities	A01 System, A02 Memory
1xxx	UI	User Interface	A01 System, A02 Memory, A04 Therapy, A05 Interface, A09 Small Keypad, A10 Large Keypad
2xxx	DC	Data Communications	A01 System, A02 Memory
3xxx	DM	Data Management	A01 System, A02 Memory
4xxx	SM	System Monitor	A01 System, A02 Memory, A04 Therapy
5xxx	PC	Processor Control	A01 System, A02 Memory
6xxx	ECG	ECG	A01 System, A02 Memory
7xxx	SAS	SAS	A01 System, A02 Memory
8xxx	L12	12-Lead ECG	A01 System, A02 Memory
9xxx	PPxx	Patient Parameter – SpO2, CO2, or NIBP	A01 System, A06 OEM PCB, A16 SpO2 Module, A21 NIBP Module, A23 CO2 Module
axxx	TH, DE, PA	Therapy, Defibrillation, Pacing	A01 System, A04 Therapy, A13 Transfer Relay Assembly, A15 Energy Storage Capacitor, A22 Biphasic PCB
bxxx	PR	Printer	A01 System, A02 Memory, A12 Printer Assembly
cxxx	PM	Power Management	A01 System, A02 Memory, A03 Power
dxxx	SC	Serial Communications	A01 System, A02 Memory, A04 Therapy

Utility Error Code Table

Initial Digit 0, Utility Error Codes (UT):		
Error	**Error Description**	**Corrective Action Code**
0002	UT_ERROR_FLASH_VPP (Error during flash block erase. Valid for all flash sizes.)	**2, 1**
0003	UT_ERROR_FLASH_ERASE (Flash memory block erase failure. Valid for all flash sizes.)	**2**
0004	UT_ERROR_FLASH_8BIT_WRITE (Error during 8 bit flash write. Error status bits indicate error information. Flash not updated.)	**1**
0005	UT_ERROR_FLASH_16BIT_WRITE (Error during 16 bit flash write. Error status bits indicate error information. Flash not updated.)	**2**
0006	UT_ERROR_FLASH_PAGE_WRITE (Error during 16 bit flash write. Error status bits indicate error information. Flash not updated.)	**2**
0008	UT_ERROR_ADC_READ (Error during ADC read. ADC serial channel not available.)	**1**
000a	UT_ERROR_DAC_FAILURE (ECG DAC selftest failed. ECG DAC Failure after cold boot.)	**1**
000c	UT_ERROR_ADC_TEST_REG (ADC Test Register Failure. ADC Test Register test failure. Failure to read the register after 3 tries. May also be caused by the serial channel not responding.)	**1**
000d	UT_ERROR_ADC_CAL_NOT_COMPLETE (ADC busy bit not clear 150ms after calibration. ADC Self-Test Calibration test failure.)	**1**
000e	UT_ERROR_VP_FLASH_ID_UNKNOWN (Unknown manufacture/device id for voice/printer flash.)	**2, 1**
000f	UT_ERROR_DP_FLASH_ID_UNKNOWN (Unknown manufacture/device id for data/program flash.)	**2, 1**

User Interface Error Code Table

Initial Digit 1, User Interface Error Codes (UI):		
Error	**Error Description**	**Corrective Action Code**
1005	UI_ERROR_DISPLAY_SELF_TEST (Self test failed. Upper 16 bits of status code contain the expected CRC, the lower 16-bits contain the actual CRC.)	**1**
1006	UI_ERROR_ENERGY_FAULT Defib charge out of 15% tolerance. Occurs only during manual mode.)	**28, 10, 6, 1**
1007	UI_ERROR_12LEAD_KEY_SEEN (This unit is not configured to support 12-lead, but the software saw a key closure of this key.)	**11, 8, 4,1**
1008	UI_ERROR_ANALYZE_KEY_SEEN (This unit is not configured to support AED mode, but the software saw a key closure of this key.)	**11, 8, 4,1**
1009	UI_ERROR_ADVISORY_KEY_SEEN (This unit is not configured to support AED mode, but the software saw a key closure of this key.)	**11, 8, 4,1**
100a	UI_ERROR_NIBP_KEY_SEEN (This unit is not configured to support NIBP, but the software saw a key closure of this key.)	**11, 8, 4,1**
100b	UI_ERROR_CURRENTUP_KEY_SEEN (This unit is not configured to support pacing, but the software saw a key closure of this key.)	**11, 8, 4,1**
100c	UI_ERROR_CURRENTDOWN_KEY_SEEN (This unit is not configured to support pacing, but the software saw a key closure of this key.)	**11, 8, 4,1**
100d	UI_ERROR_RATEUP_KEY_SEEN (This unit is not configured to support pacing, but the software saw a key closure of this key)	**11, 8, 4,1**
100e	UI_ERROR_RATEDOWN_KEY_SEEN (This unit is not configured to support pacing, but the software saw a key closure of this key.)	**11, 8, 4,1**
100f	UI_ERROR_PACER_KEY_SEEN (This unit is not configured to support pacing, but the software saw a key closure of this key.)	**11, 8, 4,1**
1010	UI_ERROR_PAUSE_KEY_SEEN (This unit is not configured to support pacing, but the software saw a key closure of this key.)	**11, 8, 4,1**
1fff	UI_ERROR_EXTRA_INFORMATION (Extra error code information for an above error.)	**9**

Data Management Error Code Table

Initial Digit 3, Data Management Error Codes (DM):		
Error	**Error Description**	**Corrective Action Code**
3005	DM_ERROR_DATABASE_ERASE_ADJUST (Not able to write new lints for new oldest record, disables flash.)	**31, 2**
3006	DM_ERROR_DATABASE_ERASE_FAILED (Erase block failed, disables flash - param is block requested.)	**31, 2**
3007	DM_ERROR_DATABASE_ERASE_VERIFY (Verification of erased block failed, disabled flash - param is block.)	**31, 2**
3008	DM_ERROR_DATABASE_FLASH_ERASE (Erase database failed, disables flash. - param is block # of failure.)	**31, 2**
3fff	DM_ERROR_EXTRA_INFORMATION (Extra error code information for an above error.)	**28, 31, 2**

System Monitor Error Code Table

Initial Digit 4, Error Codes (SM):		
Error	**Error Description**	**Corrective Action Code**
4009	SM_ERROR_RAM_FAILURE (RAM failure during selftest. 16-Bit ram test failure - param = address of failure).	**4, 6, 1**
400a	SM_ERROR_BAD_CRC (CRC in program flash bad. Program test failure (value = hi 16-bits expected CRC, lo 16-bits include computed CRC).)	**4, 6, 1**
400b	SM_ERROR_CRC_FAILURE (Program contents failed CRC test - value = hi 16-bits expected CRC, lo 16-bits include computed CRC).)	**4, 6, 1**
400c	SM_ERROR_VOLTAGE_LOW (ADC voltage reading low. HW Voltage low - status code hi 8-bits contains adc value, lo 8-bits contains channel #)	**4, 6, 1**
400d	SM_ERROR_VOLTAGE_HIGH (ADC voltage reading high. HW Voltage high - status code hi 8-bits contains adc value, lo 8-bits contains channel #)	**4, 6, 1**
4010	SM_ERROR_SERVICE_LED (Service LED failure. LED expected to be on and it is not.)	**4, 6, 1**
4011	SM_ERROR_DEFIB_SERVICE_SYNC (Failed to synchronize the defib charge after cold boot. - param = time since last boot)	**4, 6, 1**
4012	SM_ERROR_FONT_VOICE_CKSUM (Invalid checksum in font/voice . Font Voice checksum error found after cold boot.)	**4, 6, 1**
4013	SM_ERROR_FONT_VOICE_CRC (Invalid CRC in font/voice flash. Font Voice CRC error - status code top 16-bits are stored CRC, lo 16-bits are computed CRC)	**4, 6, 1**

Processor Control Error Code Table

Initial Digit 5, Error Codes (PC):		
Error	**Error Description**	**Corrective Action Code**
5002	PC_ERROR_WATCHDOG_SHORT_FAILURE (Main watchdog short test failure. Watchdog failure param = 0=None;1=short;2=long;3-power)	1
5003	PC_ERROR_WATCHDOG_LONG_FAILURE (Main watchdog long test failure. Watchdog failure param = 0=None;1=short;2=long;3-power)	1
5004	PC_ERROR_WATCHDOG_UNEXPECTED (Unexpected Main watchdog reset. Top 16-bits = sec since last set. Low 16-bits = wdog status.)	1
5005	PC_ERROR_RAM_AT_BOOT (RAM error detected during boot. param = Ram Addr of error.)	8, 2, 1
5006	PC_ERROR_BAD_CHECKSUM (Program contents failed Checksum test)	1
500d	PC_ERROR_CONFIG_VERSION (System configuration version mismatch. param = value read.)	1
500e	PC_ERROR_CONFIG_CRC (NVRAM system configuration CRC bad. param = value read.)	8, 1
5011	PC_ERROR_METERS_VERSION (System meters version mismatch. param = value read.)	8, 1
5012	PC_ERROR_METERS_CRC (NVRAM system meters/counters CRC bad. param = value read.)	1
5013	PC_ERROR_MFG_DATA_VERSION (Manufacturing data version mismatch)	8, 1
5014	PC_ERROR_MFG_DATA_CRC (NVRAM manufacturing data CRC bad)	1
5015	PC_ERROR_FORCED_RESET_FAILED (Forced watchdog reset failed. Unit failed to reset.)	1
5019	PC_ERROR_RTC_BAD (RTC is not running)	1
501a	PC_ERROR_RTC_DRIFT (Processor and RTC time out of sync. param = drift)	1
501b	PC_ERROR_EXC_UNKNOWN (Processor fault, unknow fault type. Reported twice. 1st with param to indicate Fault ID, 2nd to indicate tid.)	2, 1
501c	PC_ERROR_EXC_PARALLEL (Processor parallel fault. Reported twice. 1st with param to indicate Fault ID, 2nd to indicate tid.)	2, 1

(Continued on next page)

Processor Control Error Code Table *(continued)*

Initial Digit 5, Processor Control Error Codes (PC) (continued):

Error	Error Description	Corrective Action Code
501d	PC_ERROR_EXC_TRACE_INSTRUCTION (Processor instruction trace fault. Reported twice. 1st with param to indicate Fault ID, 2nd to indicate tid.	2, 1
501e	PC_ERROR_EXC_TRACE_BRANCH (processor branch trace fault. Reported twice. 1st with param to indicate Fault ID, 2nd to indicate tid.)	2, 1
501f	PC_ERROR_EXC_TRACE_CALL (processor call trace fault. Reported twice. 1st with param to indicate Fault ID, 2nd to indicate tid.)	2, 1
5020	PC_ERROR_EXC_TRACE_RETURN (processor return trace fault. Reported twice. 1st with param to indicate Fault ID, 2nd to indicate tid.)	2, 1
5021	PC_ERROR_EXC_TRACE_PRERETURN (processor prereturn trace fault. Reported twice. 1st with param to indicate Fault ID, 2nd to indicate tid.)	2, 1
5022	PC_ERROR_EXC_TRACE_SUPERVISOR (processor supervisor trace fault. Reported twice. 1st with param to indicate Fault ID, 2nd to indicate tid.)	2, 1
5023	PC_ERROR_EXC_TRACE_MARK (processor mark trace fault. Reported twice. 1st with param to indicate Fault ID, 2nd to indicate tid.)	2, 1
5024	PC_ERROR_EXC_TRACE_UNKNOWN (processor trace fault, unknown subtype . Reported twice. 1st with param to indicate Fault ID, 2nd to indicate tid.)	2, 1
5025	PC_ERROR_EXC_OP_INVALID_OPCODE (processor invalid opcode operation fault. Reported twice. 1st with param to indicate Fault ID, 2nd to indicate tid.)	2, 1
5026	PC_ERROR_EXC_OP_UNIMPLEMENTED (processor unimplemented operation fault. Reported twice. 1st with param to indicate Fault ID, 2nd to indicate tid)	2, 1
5027	PC_ERROR_EXC_OP_UNALIGNED (processor unaligned operation fault . Reported twice. 1st with param to indicate Fault ID, 2nd to indicate tid.)	2, 1

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Processor Control Error Code Table *(continued)*

Initial Digit 5, Processor Control Error Codes (PC) (continued):

Error	Error Description	Corrective Action Code
5028	PC_ERROR_EXC_OP_INVALID_OPERAND (processor invalid operand operation fault. Reported twice. 1st with param to indicate Fault ID, 2nd to indicate tid.)	2, 1
5029	PC_ERROR_EXC_OP_UNKNOWN (processor operation fault, unknown subtype. Reported twice. 1st with param to indicate Fault ID, 2nd to indicate tid.)	2, 1
502a	PC_ERROR_EXC_ARITH_OVERFLOW (processor integer overflow arithmetic fault. Reported twice. 1st with param to indicate Fault ID, 2nd to indicate tid.)	2, 1
502b	PC_ERROR_EXC_ARITH_ZERO_DIVIDE (processor zero-divide arithmetic fault. Reported twice. 1st with param to indicate Fault ID, 2nd to indicate tid.)	2, 1
502c	PC_ERROR_EXC_ARITH_UNKNOWN (processor arithmetic fault, unknown subtype. Reported twice. 1st with param to indicate Fault ID, 2nd to indicate tid.)	2, 1
502d	PC_ERROR_EXC_CONSTRAINT (processor constraint fault. Reported twice. 1st with param to indicate Fault ID, 2nd to indicate tid.)	2, 1
502e	PC_ERROR_EXC_PROTECTION (processor protection fault. Reported twice. 1st with param to indicate Fault ID, 2nd to indicate tid.)	2, 1
502f	PC_ERROR_EXC_TYPE (processor type fault. Reported twice. 1st with param to indicate Fault ID, 2nd to indicate tid.)	2, 1

ECG Error Code Table

Initial Digit 6, ECG Error Codes (ECG):		
Error	**Error Description**	**Corrective Action Code**
600c	ECG_ERROR_DSP_VOLTAGE (DSP preamp supply voltage out of range)	**1**
600d	ECG_ERROR_PREAMP_CALIBRATION (NVRAM calibration constants out of range. HW Unit reported calibration error.)	**20**
600e	ECG_ERROR_NVRAM_FAULT (NVRAM redundant value mismatch detected. NVRAM possibly bad.)	**20**

12-Lead ECG Error Code Table

Initial Digit 8, 12-Lead ECG Error Codes (L12):		
Error	**Error Description**	**Corrective Action Code**
8001	L12_ERROR_UNKNOWN (Obsolete)	**28, 2, 1**
8002	L12_ERROR_ANALYSIS_SEMAPHORE (Obsolete)	**28**
8003	L12_ERROR_STATE_SEMAPHORE (Obsolete)	**28**
8004	L12_ERROR_QUEUING_COMMANDS (Obsolete)	**28, 3**
8005	L12_ERROR_CREATING_QUEUE (Obsolete)	**28**
8006	L12_ERROR_UNKNOWN_START (Obsolete)	**28, 5**
8007	L12_ERROR_UNKNOWN_COMMAND (Obsolete)	**28, 5**
8008	L12_ERROR_BAD_STATE (Obsolete)	**28, 1**
8009	L12_ERROR_FALLING_BEHIND (Obsolete)	**28, 3**

Patient Parameter Error Code Table

Initial Digit 9, Patient Parameter Error Codes (PP):

Error	Error Description	Corrective Action Code
9002	PPSP_ERROR_MODULE (Masimo error (param = Masimo error code). If the error is 63, code may be followed by a second error reporting the diagnostic code.)	**33, 12, 1**
900a	PPSP_ERROR_COMMUNICATION (lure to communicate with the spo2 module after 5 seconds. The spo2 HW detection error param = 0:Spo2 missing; 1:Spo2 present but not MFG configured.)	**33, 12, 1** **28, s/w v.101 or later**
900c	PPSP_ERROR_WRITING_TO_MODULE (Failure to write setup commands to spo2 module.)	**33, 12, 1**
900d	PPSP_ERROR_SpO2_VALUE (Invalid saturation or pulse rate from spo2 module. spo2 value or pulse rate not valid.)	**33, 12, 1**
900e	PPSP_ERROR_CONFIG (Spo2 module detected but not in manufacturing configuration (param=1:found masimo but should not; 2:unit not found).)	**5, 12, 1**
900f	PPSP_ERROR_RAW_IOCTL_FAILED (ioctl() call failed. SW Options set failure - status = ioctl return code. 0	**33, 12, 1**
9010	PPSP_ERROR_PARITY_IOCTL_FAILED (ioctl() call failed. SW Parity set failure - status = ioctl return code.)	**33, 12, 1**
9011	PPSP_ERROR_ENABLE_IOCTL_FAILED (ioctl() call failed. SW IO Enable set failure - status = ioctl return code.)	**33, 12, 1**
9012	PPSP_ERROR_FLUSH_IOCTL_FAILED (ioctl() call failed. SW IO Flush failure - status = ioctl return code.)	**33, 12, 1**
9013	PPSP_ERROR_POLL_IOCTL_FAILED (Unable to poll device. This is caused when the cable is disconnected - status = #bytes in buffer.)	**33, 12, 1**
9014	PPSP_ERROR_READ_FAILED (read() call failed. param = nbytes read)	**33, 12, 1**
9015	PPSP_ERROR_WRITE_FAILED (write() call failed. param = nbytes attempted)	**33, 12, 1**
9016	PPSP_ERROR_RESERVED_3 (not used)	**33, 12, 1**
9017	PPSP_ERROR_WRONG_LENGTH_WRITTEN (write() returned incorrect length. Short write (param = nbytes attempted).)	**33, 12, 1**
9018	PPSP_ERROR_OVER_CURRENT (Device reported error. Failures commonly caused by cabling or finger sensor problems.)	**33, 12, 1**
9019	PPSP_ERROR_RAM (Device reported error.)	**33, 12, 1**

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Patient Parameter Error Code Table *(continued)*

Initial Digit 9, Patient Parameter Error Codes (PP) (continued):

Error	Error Description	Corrective Action Code
901a	PPSP_ERROR_ROM (Device reported error.)	**33, 12, 1**
9103	PPNI_ERROR_COMMUNICATION (Failure to communicate to nibp module)	**34, 22**
9107	PPNI_ERROR_SELF_TEST_FAILED (NIBP module failed during selftest. param bits: 2:Self Test; 6:Loose Cuff; 7:Air Leak; 8:Air Pressure; 9::Weak Signal; 10:Out-Of-Range; 11:Motion; 12:Over Pressure; 13:Signal Saturated; 14:Pneumatic Leak; 15:System Failure; 19:TimeOut.)	**34, 22**
9108	PPNI_ERROR_RAW_IOCTL_FAILED (SW ioctl() call failed - status = ioctl return code.)	**34, 22**
9109	PPNI_ERROR_PARITY_IOCTL_FAILED (SW ioctl() call failed - status = ioctl return code.)	**34, 22**
910a	PPNI_ERROR_ENABLE_IOCTL_FAILED (SW ioctl() call failed - status = ioctl return code.)	**34, 22**
910b	PPNI_ERROR_FLUSH_IOCTL_FAILED (SW ioctl() call failed - status = ioctl return code.)	**34, 22**
910c	PPNI_ERROR_POLL_IOCTL_FAILED (SW ioctl() call failed - status = ioctl return code.)	**34, 22**
910d	PPNI_ERROR_SERIAL_READ_FAILED (read() call failed. #bytes read from device.)	**34, 22**
910e	PPNI_ERROR_WRITE_FAILED (write() call failed. param = nbytes attempted.)	**34, 22**
9110	PPNI_ERROR_WRONG_LENGTH_WRITTEN (write() returned incorrect length. Short write - param = nbytes attempted.)	**34, 22**
9116	PPNI_ERROR_MODULE_BELLY_UP (Nibp module went belly. Nibp module reset detected outside first 10sec of reading.)	**34, 22**
9117	PPNI_ERROR_MODULE_NOT_RESPONDING (Nibp module not responding to start reading command.)	**34, 22**
9119	PPNI_ERROR_CONFIG_MISMATCH (Device with nibp module not configured for it. Param is SW version.)	**5, 34, 22**

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Patient Parameter Error Code Table *(continued)*

Initial Digit 9, Patient Parameter Error Codes (PP) (continued):

Error	Error Description	Corrective Action Code
9204	PPCO_ERROR_MFG_ID (Failure to communicate to co2 module - param = msg_id.)	**35, 23**
9205	PPCO_ERROR_WRITING_TO_MODULE (co2 module detected but not in manufacturing configuration. Unit disabled. Param = config-info.)	**35, 23**
9206	PPCO_ERROR_CONFIG (CO2 module service code. Likely due to bad CO2 modules or PINCHED TUBING. - param top 16-bits = serviceCodeTime; low 16-bits = serviceCode.)	**5, 35, 23**
9208	PPCO_ERROR_PARITY_IOCTL_FAILED (co2 calibration failure, AZ Fail reported by module.)	**35, 23**
9209	PPCO_ERROR_ENABLE_IOCTL_FAILED (co2 calibration failure reported by module. status = failure reason code.)	**35, 23**
920b	PPCO_ERROR_POLL_IOCTL_FAILED (co2 calibration failed. Posted by UI when CO2 failure is unknown. This is only done in service mode - param = co2 status code.)	**35, 23**
920c	PPCO_ERROR_READ_FAILED (co2 waveform message cycle counter is out of sync. param = debounce size.)	**35, 23**
920d	PPCO_ERROR_WRITE_FAILED (Obsolete)	**35, 23**
920e	PPCO_ERROR_SELECT_FAILED (Obsolete)	**35, 23**
920f	PPCO_ERROR_WRONG_LENGTH_WRITTEN (Obsolete)	**35, 23**

Therapy Error Code Table

Initial Character a, Therapy Error Codes (TH)		
Error	**Error Description**	**Corrective Action Code**
a002	TH_ERROR_DEFIB_LINK_DOWN (Lost contact with defib processor. Serial communications link between the main and defib processor is not functioning.This unit can no longer administer defib therapy. Cycling power may clear the error temporarily, but the unit is questionable. (param = last defib message time stamp).	**10**
a003	TH_ERROR_PACER_LINK_DOWN (Lost contact with pacer processor. Serial communications link between the main and pacer processor is not functioning.)	**10**
a004	TH_ERROR_UNEXPECTED_ENERGY (Unexpected energy in the capacitor. No charge delivered.)	**10**
a005	TH_ERROR_CAP_OVERCHARGED (Over charged capacitor)	**10**
a008	TH_ERROR_DEFIB_DISABLE (No communication with Defib HW.)	**10**
a00a	TH_ERROR_DE_WRONG_ENG_SELECT (Incorrect energy select. param = energy index.)	**7, 10**
a00b	TH_ERROR_SHOCK_NOT_DELIVERED (Shock not delivered)	**10**
a00d	TH_ERROR_CHARGING_EXPIRED (Charging time expired)	**10**
a00f	TH_ERROR_CAP_OUT_OF_RANGE (Capacitor is out of range. Calibration Failure)	**10**
a010	TH_ERROR_PA_RATE_OUT_OF_RANGE (Pacing rate out of tolerance. param = hi-16 = pacer selected range, lo-16 = pacer actual rate.)	**10**
a011	TH_ERROR_PA_CURRENT_OUT_OF_RANGE (Pacing current out of tolerance. param = hi-16 = selected current, lo-16 is actual current.)	**10**
a017	TH_ERROR_DEFIB (Obsolete error codes.) **a017 extension codes 00000001- 00000033 remapped to error codes a101 through a133.)**	**10**
a018	TH_ERROR_PACER (Obsolete error codes.) **a018 extension codes 00000001- 0000001e remapped to error codes a201 through a224.)**	**15**

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Therapy Error Code Table *(continued))*

Initial Character a, Therapy Error Codes (TH) (continued):

Error	Error Description	Corrective Action Code
a01a	TH_ERROR_PACER_FAULT (Pacing fault condition occurred [rate(0), current(1), pulse width(2)], limit exceeded. (param = pacer-fault type))	6, 1
a01b	TH_ERROR_DEFIB_WDT_DISABLE_FAIL (Unable to turn off defib WDT. param = asic defib ctrl register.)	6, 1
a020	TH_ERROR_PACER_DISABLE (Pacer disable. Cannot communicate with processor)	6, 1
a021	TH_ERROR_CAP_CHARGE_FAIL (Cap. stays zero while charging. No charge. param = defib setting)	6, 1
a022	TH_ERROR_CORRUPT_ENERGY_SELECT (Energy select corrupt. param = main energy selection)	6
a023	TH_ERROR_XFER_ENABLE_ON (Defib xfer enable line high unexpected. Defib transfer-enable line was not off during startup.)	6, 1
a024	TH_ERROR_VCAP2_SATURATED (VCAP2 reading full scale all the time. Reading not processed.)	6, 1
a026	TH_ERROR_ENERGY_RESIDUE (There is still energy on the cap)	6, 1
a027	TH_ERROR_PA_RATE_CORRUPT (Pacing rate storage corrupted. param = hi-16 = rate selected; low 16 = rate actual.)	15
a028	TH_ERROR_CAL_ENERGY_FAIL (Calibrated voltage is out of range. param = hi-16 = table index, low 16 = volgage count.)	6, 1
a029	TH_ERROR_BTE_FAIL (Error condition with BTE board. param = hi-16 bits = fault type, lo-16 bits = cedar state.)	17, 1
a02b	TH_ERROR_DEFIB_CONFIG (Conflict defib type. Cold boot if test bit set else disable biphasic - param = test-bit setting.)	28
a02c	TH_ERROR_DUMP_LINE_FAIL (One of dump line failed. param = test ID.)	19
a02d	TH_ERROR_ADC_READ (ADC read failure when getting cap charge)	28

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Therapy Error Code Table *(continued)*

Initial Character a, Defib. Error Codes (DE):		
Error	**Error Description**	**Corrective Action Code**
a101	DE_ERROR_LONG_WDT (Long Watchdog test failed or Watchdog didn't reset in time.)	**7, 10**
a102	DE_ERROR_SHORT_WDT (Short Watchdog test failed.)	**10**
a103	DE_ERROR_SCI_RCV (Serial port receiver error)	**10**
a104	DE_ERROR_XFER_KEY (Defib HW error)	**10**
a106	DE_ERROR_ENERGY_OUT_OF_BOUND (VCAP-1 over/under charge.)	**28, 10**
a107	DE_ERROR_HP_ENG_SELECT (Cannot determine the rotary setting)	**10**
a109	DE_ERROR_CAL_CRC (Calibration Table CRC error.)	**10**
a10b	DE_ERROR_CHG_TIME (Takes too long to reach charge.)	**10**
a10c	DE_ERROR_CHG_ENABLE (CHG_EN1 is stuck high)	**10**
a10d	DE_ERROR_DUMP_ENERGY (Defib HW error)	**10**
a10e	DE_ERROR_RCV (Defib HW error)	**10**
a111	DE_ERROR_ENERGY_NOT_ZERO (Unexpected energy while biphasic is in hi-pot test.)	**10**
a112	DE_ERROR_TEST_XFER_ENABLE (Problem with xfer turn on at main.)	**10**
a113	DE_ERROR_TEST_XFER_ENGAGE (Error reading the transfer engage feedback.)	**10**
a114	DE_ERROR_TEST_DUMP_RELAY (Biphasic Error)	**10**
a115	DE_ERROR_TEST_ADC (Defib HW error)	**10**
a116	DE_ERROR_TEST_DAC (Defib HW error)	**10**
a117	DE_ERROR_TEST_HARDWARE (Defib HW error)	**10**
a118	DE_ERROR_TEST_RAM (Defib HW error)	**10**

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Therapy Error Code Table *(continued)*

Initial Character a, Defib. Error Codes (DE) (continued):

Error	Error Description	Corrective Action Code
a119	DE_ERROR_TEST_ROM (Defib HW error)	10
a11a	DE_ERROR_TEST_CPU (Defib HW error)	10
a11d	DE_ERROR_XFER_TIMEOUT (Defib HW error)	10
a11e	DE_ERROR_BUTTONS_UP (Defib HW error)	10
a11f	DE_ERROR_SYNC_INTERRUPT (Defib HW error)	10
a120	DE_ERROR_SELF_TEST_INCOMPLETE (Defib HW error)	10
a123	DE_ERROR_CAL_RCV_CRC (CRC failed for new calibration data.)	10
a124	DE_ERROR_CAL_NVM_CRC (Cannot write energy table to EEPROM.)	10
a125	DE_ERROR_DAC_WRITE (Byte could not be written to the DAC throug the SPI interface.)	10
a126	DE_ERROR_ADC_READ (Cannot read from ADC.)	10
a127	DE_ERROR_TEST_MODE (Must be idle to switch to test mode.)	10
a129	DE_ERROR_XFER_CABLE (Defib HW error)	10
a12a	DE_ERROR_XFER_PADDLE (Defib HW error)	10
a12c	DE_ERROR_CHG_INHIBIT (Defib HW error)	10
a12d	DE_ERROR_CHG_ENABLE_FAIL (charge enable feedback indicates not charging.)	10
a12e	DE_ERROR_BTE_FAULT (Cedar BTE Fault Line State)	25, 27
a12f	DE_ERROR_BTE_FAULT_CLEARED (Cedar BTE Fault Line State)	25, 27
a130	DE_ERROR_BTE_RESET (Defib HW error)	25
a131	DE_ERROR_NO_BTE_HW (Biphasic HW not found.)	26

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Therapy Error Code Table *(continued)*

Initial Character a, Defib. Error Codes (DE) and Pacer Error Codes (PA): (continued)		
Error	**Error Description**	**Corrective Action Code**
a132	DE_ERROR_NO_BTE_XFER ((Defib HW error))	**25, 27**
a133	DE_ERROR_BTE_CEDAR_DRV_HI (A/D high bit sticky.)	**25, 27**
a201	PA_ERROR_LONG_WDT (long watchdog timer test failed)	**15**
a202	PA_ERROR_SHORT_WDT (short watchdog timer test failed)	**15**
a203	PA_ERROR_SCI_RCV (SCI rcv overrun, framing or parity. Unit used near hi EMI causing these issues.)	**15**
a204	PA_ERROR_2MS_OVERRUN (2ms ECG sampling overrun)	**15**
a208	PA_ERROR_MSG_RESYNC (rcvd message incomplete)	**15**
a209	PA_ERROR_MSG_SIZE (rcvd msg size error/input buff full)	**15**
a20d	PA_ERROR_PACE_OVERRUN (pacing pulse process overrun. Set current to zero.)	**15**
a20e	PA_ERROR_PULSE_WIDTH (pacing pulse too long)	**15**
a20f	PA_ERROR_A2D_INT (internal A/D conversion timeout. Set current to zero.)	**15**
a210	PA_ERROR_A2D_EX (external A/D conversion timeout. Current set to zero)	**15**
a211	PA_ERROR_SPI (SPI transfer timeout. Current set to zero.)	**15**
a212	PA_ERROR_RAM_TEST (RAM test failed. Reset Pacer Processor)	**15**
a213	PA_ERROR_ROM_TEST (ROM crc test failed)	**15**
a214	PA_ERROR_CPU_TEST (stack overrun occured)	**15**
a215	PA_ERROR_STACK_CHECK (isolated +5V ref. out of range)	**15**
a216	PA_ERROR_V_ISO_MON (HV present when not pacing)	**15**
a217	PA_ERROR_V_12V_MON (+12V voltage out of range)	**15**

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Therapy Error Code Table *(continued)*

Initial Character a, Pacer Error Codes (PA) (continued):		
Error	**Error Description**	**Corrective Action Code**
a218	PA_ERROR_V_HVIS_SENSE (HV present when not pacing)	**15**
a219	PA_ERROR_V_HVIS (HVIS voltage out of range)	**15**
a21a	PA_ERROR_CAL_CURRENT (current calibration failed)	**15**
a21b	PA_ERROR_CAL_Z_300 (impedance 300 calibration failed)	**15**
a21c	PA_ERROR_CAL_CURRENT_CRC (current cal table corrupt)	**15**
a21d	PA_ERROR_CAL_IMPEDANCE_CRC (impedance cal values corrupt)	**15**
a21e	PA_ERROR_CAL_Z_0 (impedance 0 calibration failed)	**15**
a21f	PA_ERROR_PACE_I (Current present when not pacing)	**15**
a220	PA_ERROR_NO_HVIS_SENSE (no HV present when pacing)	**15**
a221	PA_ERROR_EXT_A2D_TEST (Exterrnal A/D test register reset failed)	**15**
a222	PA_ERROR_NO_CAL_HVIS_SENSE (no HV present before current cal)	**15**
a223	PA_ERROR_NO_Q4_SENSE (no Q4 sense when not pacing (Q4 shorted))	**15, 16**
a224	PA_ERROR_Q4_SENSE (Q4 sense present when pacing (CR25 open))	**15, 16**

Printer Error Code Table

Initial Character b, Printer Error Codes (PR):		
Error	**Error Description**	**Corrective Action Code**
b001	PR_ERROR_TEMP_TOO_LOW (Print head ADC reading too low. param = ADC value. May be associated with UT_ERROR_DAC_FAILURE and UT_ERROR_ADC_READ.)	**13, 28**
b002	PR_ERROR_TEMP_TOO_HIGH (Print head ADC reading too high. param = ADC value. May be associated with UT_ERROR_DAC_FAILURE and UT_ERROR_ADC_READ.)	**13, 28**
b003	PR_ERROR_SELF_TEST_FAIL (Invalid CRC read from HW. param = ADC value)	**13, 28**
b004	PR_ERROR_WRONG_PRINTER_TYPE (Saw incorrect printer for config. 50/100 mismatch.)	**13, 28**

Power Management Error Code Table

Initial Character c, Power Management Error Codes (PM):		
Error	**Error Description**	**Corrective Action Code**
c002	PM_ERROR_NO_RESPONSE (No response from power board)	**7, 1**
c006	PM_ERROR_POWER_PCB_FAULT (power PCB fault reported. Fault Status Mask. '2=PCB; '4=Battery-1; '8=Battery-2; '10=AuxPwrSuppy; '20=BatteryCommunications.)	**7**

Serial Communication Error Code Table

Initial Character d, Serial Communication Error Codes (SC):		
Error	**Error Description**	**Corrective Action Code**
d003	SC_ERROR_SCI_FRAME (SCI frame error)	**1**
d004	SC_ERROR_SCI_PARITY (SCI parity error)	**1**
d005	SC_ERROR_READ_FULL (SCI read buffer full)	**2, 1**
d006	SC_ERROR_SCI_INITIALIZE (SCI did not initialize)	**2, 1**
d00d	SC_ERROR_SCI_MSGQ_ERROR (Queue Full. Param indicates the message type, 0=pacer; 1=Defib; 2=pwr.)	**28, 2, 1**

Obsolete Error Codes After Release of Version 099 Software

If error code from this list appears in device's error log, upgrade the software to version 3011371-099 or later. No other action repair is required.

Code	Description	Corrective Action
Initial Digit 0, Utilities Diagnostic Codes (UT):		
0001	UT_ERROR_FLASH_ADDRESS	28
0007	UT_ERROR_ADC_CHANNEL	28
0009	UT_ERROR_DAC_ACCESS	28
000b	UT_ERROR_AIO_SEM_NOT_CREATED	28
Initial Digit 1, User Interface Diagnostic Codes (UI):		
1001	UI_ERROR_TIMEOUT_TABLE_FULL	28
1002	UI_ERROR_NO_TIMEOUT_SEMAPHORE	28
1003	UI_ERROR_BAD_MANUAL_ACCESS	28
1004	UI_ERROR_PADDLE_SHOCK_SEEN	28
1011	UI_ERROR_INVALID_CPR_TIME	28
1012	UI_ERROR_INVALID_AED_STATE	28
1013	UI_ERROR_INVALID_SAS_STATUS	28
1014	UI_ERROR_INVALID_SILENCE	28
1015	UI_ERROR_INVALID_CORNER	28
1016	UI_ERROR_INVALID_FILL_COLOR	28
1017	UI_ERROR_INVALID_TH_STATUS	28
1018	UI_ERROR_INVALID_SEQUENCE_COUNT	28

(Continued on next page)

Obsolete Error Codes After Release of Version 099 Software
(continued)

Code	Description	Corrective Action
Initial Digit 1, User Interface Diagnostic Codes (UI) (continued):		
1019	UI_ERROR_INVALID_MENU_CALLBACK	28
101a	UI_ERROR_INVALID_KNOB_STATE	28
101b	UI_ERROR_INVALID_PADDLES_DEFAULT	28
101c	UI_ERROR_INVALID_STYLE	28
101d	UI_ERROR_INVALID_LED_STATE	28
101e	UI_ERROR_INVALID_LED	28
101f	UI_ERROR_INVALID_CHANNEL	28
1020	UI_ERROR_INVALID_WAVE_2	28
1021	UI_ERROR_INVALID_WAVE_3	28
1022	UI_ERROR_INVALID_MENU_MODE	28
1023	UI_ERROR_INVALID_DATA_SIZE	28
1024	UI_ERROR_INVALID_SUB_FIELD	28
1025	UI_ERROR_INVALID_REPORT_TYPE	28
1026	UI_ERROR_INVALID_PACER_MODE	28
1027	UI_ERROR_INVALID_ALARM_STATE	28
1028	UI_ERROR_INVALID_QRS_STATE	28
1029	UI_ERROR_INVALID_PP_STATUS	28

(Continued on next page)

Obsolete Error Codes After Release of Version 099 Software
(continued)

Code	Description	Corrective Action
Initial Digit 1, User Interface Diagnostic Codes (UI) (continued):		
102a	UI_ERROR_INVALID_PR_STATUS	28
102b	UI_ERROR_INVALID_SERVICE_STATE	28
102c	UI_ERROR_INVALID_KEY_STYLE	28
102d	UI_ERROR_INVALID_TONE	28
102e	UI_ERROR_INVALID_MENU_TIMEOUT	28
102f	UI_ERROR_INVALID_BATTERY_CAPACITY	28
1030	UI_ERROR_INVALID_DC_STATUS	28
1031	UI_ERROR_INVALID_L12_STATUS	28
1032	UI_ERROR_INVALID_WARNING_TONE	28
1033	UI_ERROR_INVALID_WARNING_TYPE	28
1034	UI_ERROR_CREATE_TIMEOUT_SEMAPHORE	28
1035	UI_ERROR_INVALID_TIMEOUT_SEMAPHORE	28
1036	UI_ERROR_CREATE_EVENT_QUEUE	28
Initial Digit 2, Data Communications Diagnostic Codes (DC):		
2001	DC_ERROR_UNKNOWN	28
2002	DC_ERROR_DC_MSG_QUEUE_CREATE	28
2003	DC_ERROR_RING_BUFFER_CREATE	28
2004	DC_ERROR_UNABLE_TO_INITIATE_SERIAL_PORT	28

(Continued on next page)

Obsolete Error Codes After Release of Version 099 Software
(continued)

Code	Description	Corrective Action
Initial Digit 2, Data Communications Diagnostic Codes (DC) (continued):		
2005	DC_ERROR_UNABLE_TO_INITIATE_PCMCIA	28
2006	DC_ERROR_UNABLE_CLOSE_PC_CARD_FD	28
2007	DC_ERROR_UNABLE_TO_ACCESS_MSG_Q	28
2008	DC_ERROR_UNSUCCESSFUL_DEVICE_READ	28
2009	DC_ERROR_UNSUCCESSFUL_RING_BUFFER_READ	28
200a	DC_ERROR_UNSUCCESSFUL_RING_BUFFER_WRITE	28
200b	DC_ERROR_UNSUCCESSFUL_DEVICE_WRITE	28
200c	DC_ERROR_UNKNOWN_FD_DURING_QUERY	28
200d	DC_ERROR_UNKNOWN_FD_DURING_WRITE	28
200e	DC_ERROR_UNABLE_TO_COMPLETE_WRITE	28
200f	DC_ERROR_UNKNOWN_ACCESSOR	28
2010	DC_ERROR_UP_TO_APP_MSG_QUEUE_WRITE	28
2011	DC_ERROR_UNABLE_TO_INIT_UART_FOR_DIRECT_XFER	28
2012	DC_ERROR_UNABLE_TO_RESET_UART_FOR_DIRECT_XFER	28
2013	DC_ERROR_UNABLE_TO_INIT_UART_FOR_EXT_XFER	28
2014	DC_ERROR_UNABLE_TO_RESET_UART_FOR_EXT_XFER	28
2015	DC_ERROR_UNABLE_TO_GET_DM_REPORT	28
2016	DC_ERROR_DOWN_TO_SESSION_MSG_QUEUE_WRITE	28

(Continued on next page)

Obsolete Error Codes After Release of Version 099 Software
(continued)

Code	Description	Corrective Action
Initial Digit 3, Data Management Diagnostic Codes (DM):		
3001	DM_ERROR_UNKNOWN	28
3002	DM_ERROR_MAIN_CREATING_SEM	28
3003	DM_ERROR_MAIN_BAD_BOOT	28
3004	DM_ERROR_MAIN_QUEUE_FULL	28
3009	DM_ERROR_DATABASE_CREATE_SEM	28
300a	DM_ERROR_DATABASE_EPISODE_END	28
300b	DM_ERROR_DATABASE_FLASH_BAD	28
300c	DM_ERROR_DATABASE_WRITE_HEADER	28
300d	DM_ERROR_DATABASE_WRITE_CONTENT	28
300e	DM_ERROR_DATABASE_REWRITE_HDR	28
300f	DM_ERROR_DATABASE_REWRITE_WF	28
3010	DM_ERROR_DATABASE_REWRITE_VS	28
3011	DM_ERROR_DATABASE_REWRITE_CONT	28
3012	DM_ERROR_DATABASE_REWRITE_DELTA	28
3013	DM_ERROR_DATABASE_VERIFY_HEADER	28
3014	DM_ERROR_DATABASE_VERIFY_CONTENT	28
3015	DM_ERROR_DATABASE_READ_CRC	28
3016	DM_ERROR_BUFFER_ZEROED	28

(Continued on next page)

Obsolete Error Codes After Release of Version 099 Software
(continued)

Code	Description	Corrective Action
Initial Digit 3, Data Management Diagnostic Codes (DM) (continued):		
3017	DM_ERROR_BUFFER_FALLING_BEHIND	28
3018	DM_ERROR_SCP_INIT_FAIL	28
3019	DM_ERROR_SCP_BUFFER_OVERRUN	28
301a	DM_ERROR_BAD_LINKED_LIST	28
301b	DM_ERROR_SCP_MEM_OVERRUN	28
301c	DM_ERROR_SCP_MM_SEM_FAILED	28
301d	DM_ERROR_CHECK_NO_TYPE	28
301e	DM_ERROR_CHECK_BAD_TYPE	28
301f	DM_ERROR_CHECK_BAD_CRC	28
3020	DM_ERROR_CHECK_NEWEST_FIND	28
3021	DM_ERROR_CHECK_OLDEST_FIND	28
3022	DM_ERROR_CHECK_EVENT_ID	28
3023	DM_ERROR_CHECK_REST_BLOCK	28
3024	DM_ERROR_MAIN_PKT_SEM	28
3025	DM_ERROR_MAIN_CBUFFER_SEM	28
3026	DM_ERROR_CHECK_OLDEST_TOTAL	28
3027	DM_ERROR_CHECK_NEWEST_TOTAL	28
3028	DM_ERROR_DELETE_EPISODE	28

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Obsolete Error Codes After Release of Version 099 Software
(continued)

Code	Description	Corrective Action
Initial Digit 3, Data Management Diagnostic Codes (DM) (continued):		
3029	DM_ERROR_STORE_VITAL_SIGNS	28
302a	DM_ERROR_STORE_WRITE	28
302b	DM_ERROR_DATABASE_RESET	28
302c	DM_ERROR_CHECK_FIRST_RECORD	28
302d	DM_ERROR_SCP_LEAD_ERROR	28
302e	DM_ERROR_CHECK_EPISODE	28
302f	DM_ERROR_STORAGE_OPEN	28
3030	DM_ERROR_STORAGE_CLOSE	28
3031	DM_ERROR_STORAGE_ERASE	28
3032	DM_ERROR_STOARGE_CLEAR	28
3033	DM_ERROR_STORAGE_WRITE	28
3034	DM_ERROR_STORAGE_READ	28
3035	DM_ERROR_STORAGE_CRC	28
3036	DM_ERROR_STORE_WFSEM_TIMEOUT	28
3037	DM_ERROR_STORE_SEM_TIMEOUT	28
3038	DM_ERROR_DATABASE_SEM_TIMEOUT	28
3039	DM_ERROR_FLASH_SEM_TIMEOUT	28
303a	DM_ERROR_CONTECG_SEM_TIMEOUT	28

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Obsolete Error Codes After Release of Version 099 Software
(continued)

Code	Description	Corrective Action
Initial Digit 3, Data Management Diagnostic Codes (DM) (continued):		
303b	DM_ERROR_BUFFER_SEM_TIMEOUT	28
303C	DM_ERROR_BUFFER_SEM_CREATE	28
3040	DM_ERROR_CONTECG_SEM_TIMEOUT	28
3041	DM_ERROR_BUFFER_SEM_TIMEOUT (	28
3042	DM_ERROR_BUFFER_SEM_CREATE	28
3043	DM_ERROR_FLASH_BLOCK	28
3044	DM_ERROR_FLASH_OFFSET	28
3045	DM_ERROR_WR_HD_VERIFY	28
3ffe	DM_DIAG_EXTRA _INFORMATION	28
Initial Digit 4, System Monitor Diagnostic Codes (SM):		
4001	SM_ERROR_INIT_UNKNOWN_TASK_ID	28
4002	SM_ERROR_UNKNOWN_TASK_ID	28
4003	SM_ERROR_TASK_SUSPENDED	28
4004	SM_ERROR_TASK_NOT_FOUND	28
4005	SM_ERROR_LOG_CRC	28
4006	SM_ERROR_LOG_MSGQ_NOT_CREATED	28
4007	SM_ERROR_LOG_MSGQ_ERROR	28
4008	SM_ERROR_LOG_LENGTH	28

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Obsolete Error Codes After Release of Version 099 Software
(continued)

Code	Description	Corrective Action
Initial Digit 4, System Monitor Diagnostic Codes (SM) (continued):		
400e	SM_ERROR_STACK_LOW	28
400f	SM_ERROR_TASK_INFO_GET	28
4014	SM_ERROR_DIAG_CRC	28
4015	SM_ERROR_DIAG_LENGTH	28
Initial Digit 5, Processor Control Diagnostic Codes (PC):		
5001	PC_ERROR_SYNC_SEM_NOT_CREATED	28
5007	PC_ERROR_RTC_SEM_NOT_CREATED	28
5008	PC_ERROR_NVRAM_SEM_NOT_CREATED	28
5009	PC_ERROR_TASK_NOT_SPAWNED	28
500a	PC_ERROR_TASK_INIT_TIMEOUT	28
500b	PC_ERROR_TASK_INIT_SEMAPHORE	28
500c	PC_ERROR_TASK_DELINQUENT	28
500f	PC_ERROR_CONFIG_LIMIT	28
5010	PC_ERROR_CREATE_WATCHDOG	28
5016	PC_ERROR_BAD_SHUTDOWN_TIME	28
5017	PC_ERROR_BAD_ABS_SHUTDOWN_TIME	28
5018	PC_ERROR_PACER_POWER_CONTROL	28
5030	PC_ERROR_CRITICAL_DATA_CORRUPT	28

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Obsolete Error Codes After Release of Version 099 Software
(continued)

Initial Digit 5, Processor Control Diagnostic Codes (PC) (continued):

Code	Description	Corrective Action
5031	PC_ERROR_RESET_UNKNOWN	28
5100	PC_ERROR_UT_DELINQUENT	28
5101	PC_ERROR_UI_DELINQUENT	28
5102	PC_ERROR_DC_DELINQUENT	28
5103	PC_ERROR_DM_DELINQUENT	28
5104	PC_ERROR_SM_DELINQUENT	28
5105	PC_ERROR_PC_DELINQUENT	28
5106	PC_ERROR_ECG_DELINQUENT	28
5107	PC_ERROR_SAS_DELINQUENT	28
5108	PC_ERROR_L12_DELINQUENT	28
5109	PC_ERROR_PP_DELINQUENT	28
510a	PC_ERROR_TH_DELINQUENT	28
510b	PC_ERROR_PR_DELINQUENT	28
510c	PC_ERROR_PM_DELINQUENT	28
510d	PC_ERROR_SC_DELINQUENT	28

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Obsolete Error Codes After Release of Version 099 Software

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Code	Description	Corrective Action
Initial Digit 6, ECG Diagnostic Codes (ECG):		
6001	ECG_ERROR_X	**28**
6002	ECG_ERROR_MSG_QUEUE_CREATE	**28**
6003	ECG_ERROR_MSG_QUEUE_SEND	**28**
6004	ECG_ERROR_MSG_QUEUE_RECEIVE	**28**
6005	ECG_ERROR_CONNECT_SYS_INT	**28**
6006	ECG_ERROR_CONNECT_PKT_INT	**28**
6007	ECG_ERROR_SAS_MOTION_QUEUE_SEND	**28**
6008	ECG_ERROR_SAS_ECG_QUEUE_SEND	**28**
6009	ECG_ERROR_CREATE_WATCHDOG	**28**
600a	ECG_ERROR_SEMAPHORE_CREATE	**28**
600b	ECG_ERROR_CMD_QUEUE_FULL	**28**

(Continued on next page)

Obsolete Error Codes After Release of Version 099 Software
(continued)

Code	Description	Corrective Action
Initial Digit 7, SAS Diagnostic Codes (SAS):		
7001	SAS_ERROR_X	28
7002	SAS_ERROR_WDOG_STATUS	28
7003	SAS_ERROR_WDOG_CREATE	28
7004	SAS_ERROR_INVALID_CMND	28
7005	SAS_ERROR_INVALID_STATE	28
7006	SAS_ERROR_LIMIT_CTR_PTR	28
7007	SAS_ERROR_INVALID_TI_COMMAND	28
7008	SAS_ERROR_TI_COMMAND_NOT_IDLE	28
7009	SAS_ERROR_TI_REQUEST_WRITE	28
700a	SAS_ERROR_TI_MSGQ_NOT_CREATED	28
700b	SAS_ERROR_TI_QUEUE_READ	28
700c	SAS_ERROR_UI_QUEUE_READ	28
700d	SAS_ERROR_UI_COMMAND_NOT_IDLE	28
700e	SAS_ERROR_INVALID_UI_COMMAND	28
700f	SAS_ERROR_UI_QUEUE_WRITE	28
7010	SAS_ERROR_ECG_FALLING_BEHIND	28
7011	SAS_ERROR_IMP_FALLING_BEHIND	28
7012	SAS_ERROR_UI_MSGQ_NOT_CREATED	28
7013	SAS_ERROR_COULD_NOT_INIT	28

(Continued on next page)

Obsolete Error Codes After Release of Version 099 Software
(continued)

Code	Description	Corrective Action Code
Initial Digit 9, Patient Parameters Diagnostic Codes (PP):		
9001	PPSP_ERROR_OPEN_DEVICE	28
9003	PPSP_ERROR_PLETHYSMOGRAPH_INVALID	28
9004	PPSP_ERROR_INVALID_FAST_MSG	28
9005	PPSP_ERROR_VERSION_MSG_LENGTH	28
9006	PPSP_ERROR_INVALID_SLOW_MSG	28
9007	PPSP_ERROR_SLOW_DATA_LENGTH	28
9008	PPSP_ERROR_SLOW_MSG_LENGTH	28
9009	PPSP_ERROR_SLOW_MSG_CHECKSUM	28
900b	PPSP_ERROR_MFG_ID	28
901b	PPSP_ERROR_UNKNOWN	28
9028	PPSP_DIAG_OVER_CURRENT	28
9029	PPSP_DIAG_RAM	28
902a	PPSP_DIAG_ROM	28
9101	PPNI_ERROR_OPEN_DEVICE	28
9102	PPNI_ERROR_CHECKSUM	28
9104	PPNI_ERROR_MFG_ID	28

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Obsolete Error Codes After Release of Version 099 Software
(continued)

Code	Description	Corrective Action Code
Initial Digit 9, Patient Parameters Diagnostic Codes (PP) (continued):		
9105	PPNI_ERROR_WRITING_TO_MODULE	28
9106	PPNI_ERROR_CONFIG	28
910f	PPNI_ERROR_SELECT_FAILED	28
9111	PPNI_ERROR_RING_BUFF_CREATE_FAILED	28
9112	PPNI_ERROR_RING_BUFFER_WRITE_FAILED	28
9113	PPNI_ERROR_INCORRECT_RESULTS_STATUS	28
9114	PPNI_ERROR_BAD_PRESSURE_SELECTED	28
9115	PPNI_ERROR_BAD_INTERVAL_SELECTED	28
9118	PPNI_ERROR_LEAKAGE_TEST_FAILED	28
9201	PPCO_ERROR_OPEN_DEVICE	28
9202	PPCO_ERROR_CHECKSUM	28
9203	PPCO_ERROR_COMMUNICATION	28
9207	PPCO_ERROR_RAW_IOCTL_FAILED	28
920a	PPCO_ERROR_FLUSH_IOCTL_FAILED	28

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Obsolete Error Codes After Release of Version 099 Software
(continued)

Code	Description	Corrective Action Code
Initial Character a, Therapy Diagnostic Codes (TH):		
a001	TH_ERROR_ERROR_UNKNOWN	28
a006	TH_ERROR_WRONG_DEFIB_MODE	28
a007	TH_ERROR_WRONG_DEFIB_STATE	28
a009	TH_ERROR_UNKOWN_DE_RESPOND	28
a00c	TH_ERROR_WRONG_TRANSFER_REQUEST	28
a00e	TH_ERROR_WRONG_CHARGE_REQUEST	28
a012	TH_ERROR_PA_MISS_RATE	28
a013	TH_ERROR_PA_MISS_CURRENT	28
a014	TH_ERROR_DE_MISS_ENERGY	28
a015	TH_ERROR_MSGQ_NOT_CREATED	28
a016	TH_ERROR_MSG_CHECKSUM	28
a019	TH_ERROR_XFER_HOLD_TEST	28
a01c	TH_ERROR_UNKWN_ADC_READ_REQUEST	28
a01d	TH_ERROR_UNKWN_DEFIB_STATE	28
a01e	TH_ERROR_UNKWN_ERR_ACTION	28
a01f	TH_ERROR_UNKWN_TEST_RESULT	28
a025	TH_ERROR_CORRUPT_PACER_STAT	28

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Obsolete Error Codes After Release of Version 099 Software
(continued)

Code	Description	Corrective Action Code
Initial Character a, Therapy Diagnostic Codes (TH, DE or PA) (continued):		
a02a	TH_ERROR_BTE_UNKWN_ENERGY (	28
a105	DE_ERROR_REDUN_MEM	28
a108	DE_ERROR_INVALID_ENERGY	28
a10a	DE_ERROR_UKWN_STATE	28
a10f	DE_ERROR_BUF_OUT	28
a110	DE_ERROR_IGNORE_CHARGE	28
a11b	DE_ERROR_TEST_STACK	28
a11c	DE_ERROR_UNKNOWN _COMMAND	28
a121	DE_ERROR_MESSAGE_ABORTED	28
a122	DE_ERROR_MESSAGE_CHECKSUM	28
a128	DE_ERROR_TEST_COMMAND	28
a12b	PA_ERROR_BACKGROUND_IDLE	28
a205	PA_ERROR_TICK_OVERRUN	28
a206	PA_ERROR_MSG_CHKSUM	28
a207	PA_ERROR_MSG_ID	28
a20a	PA_ERROR_SEQUENCING	28
a20b	PA_ERROR_UNKNOWN _RATE	28
a20c	PA_ERROR_UNKNOWN_CURRENT	28

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Obsolete Error Codes After Release of Version 099 Software
(continued)

Code	Description	Corrective Action Code
Initial Character b, Printer Diagnostic Codes (PR):		
b005	PR_ERROR_FALLING_BEHIND	28
b006	PR_ERROR_WAITING_FOR_DATA	28
b007	PR_ERROR_INVALID_ANNOTATION_STATE	28
b008	PR_ERROR_INVALID_LEAD_TO_STATUS	28
b009	PR_ERROR_INVALID_ALARM_EVENT	28
b00a	PR_ERROR_INVALID_PACER_EVENT_TYPE	28
b00b	PR_ERROR_INVALID_STROBE_STATE	28
b00c	PR_ERROR_INVALID_EVENT	28
b00d	PR_ERROR_INVALID_L12_LEAD	28
b00e	PR_ERROR_INVALID_GAIN	28
be00	PRFAX_ERROR_RING_BUFFER_CREATE	28
be01	PRFAX_ERROR_ACCESS_RING_BUFFER	28
be02	PRFAX_ERROR_4DEBUG	28
Initial Character c, Power Management Diagnostic Codes (PM):		
c001	PM_ERROR_MSGQ_ERROR	28
c003	PM_ERROR_MSG_UNKNOWN	28
c004	PM_ERROR_BAD_CHECKSUM	28
c005	PM_ERROR_MSG_SIZE	28

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Obsolete Error Codes After Release of Version 099 Software
(continued)

Initial Character d, Serial Communications Diagnostic Codes (SC):

Code	Description	Corrective Action
d001	SC_ERROR_DRIVER_INSTALL	28
d002	SC_ERROR_DEVICE_CREATE	28
d007	SC_ERROR_DEVICE_NOT_SUPPORTED	28
d008	SC_ERROR_COULD_NOT_OPEN	28
d009	SC_ERROR_SCI_FIOSETOPTIONS	28
d00a	SC_ERROR_MSG_SIZE	28
d00b	SC_ERROR_SCI_WRITE	28
d00c	SC_ERROR_SELECT	28
d00e	SC_ERROR_MSGQ_NOT_CREATED	28
d00f	SC_ERROR_RX_SEM_NOT_CREATED	28
d010	SC_ERROR_IOCTL_FAILED	28
d011	SC_ERROR_PADDLES_MSG_CKSUM	28
d012	SC_ERROR_PADDLES_MSG_SIZE	28
d013	SC_ERROR_PADDLES_MSG_ID	28

Corrective Action Codes

Corrective action codes are referenced in the **Error Code Table**. If more than one action is listed under Description, perform them in the order indicated.

Corrective Action Code	Description
1	System Communications or System Processing Error: a. Possible transient from input power (**Clear Error**, conduct **PIP**). b. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary. c. **Replace A01 System PCB**.
2	Memory Error: a. Possible transient from input power (**Clear Error**, conduct **PIP**). b. **Clear the Data Management Memory**; conduct **PIP**. c. **Replace A02 Memory PCB**.
3	System Overload: Reduce number of simultaneous operations (for example, transmitting, printing, setting options).

(Continued on next page)

Corrective Action Codes *(continued)*

Corrective Action Code	Description
4	System Error: Cease unusual activity (for example, pressing keypad controls in rapid succession or in multiple combinations).
5	Test Interface Input Error: Improper action or keyboard entry.
6	Therapy Processor Error: a. Possible transient from input power (**Clear Error**, conduct **PIP**). b. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary. c. **Replace A04 Therapy PCB**.
7	Power Processor Error: a. Possible transient from input power (**Clear Error**, conduct **PIP**). b. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary. c. **Replace A03 Power PCB**.

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Corrective Action Codes *(continued)*

Corrective Action Code	Description
8	Nonvolatile RAM on **Coin Battery** power: Review **Verifying Device Configuration Data**.
9	Additional error extension (adds on to previous error).
10	Defibrillator out of calibration: a. Complete the **TCP – Defibrillator Self Calibration** procedure, and then conduct **PIP**. b. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary. c. **Replace A04 Therapy PCB** or **Replace A22 Biphasic PCB / A14 Inductive Resistor (Biphasic Devices Only)**
11	Keypad Error: a. Possible transient from input power (**Clear Error**, conduct **PIP**). b. Replace indicated **A09 Small Keypad** or **A10 Large Keypad**. c. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary.

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Corrective Action Codes *(continued)*

Corrective Action Code	Description
12	SpO2 Error: a. Possible transient from input power (**Clear Error**, conduct **PIP**). b. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary. c. **Replace A16 SpO2 Module**. d. **Replace A06 OEM PCB**.
13	Printer Error: a. Possible transient from input power (**Clear Error**, conduct **PIP**). b. Incorrect A12 Printer Assembly is installed (for example, 100 mm instead of 50 mm). c. **Replace A12 Printer Assembly**. d. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary.
14	Defibrillation Capacitor Error: a. Possible transient from input power (**Clear Error**, conduct **PIP**). b. **Replace A15 Energy Storage Capacitor**.

(Continued on next page)

Corrective Action Codes *(continued)*

Corrective Action Code	Description
15	Pacer out of calibration: a. Complete the **TCP – Pacing Self Calibration** procedure, and then conduct **PIP**. b. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary. c. **Replace A04 Therapy PCB**.
16	Pacer output circuit damaged: a. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary. b. **Replace A04 Therapy PCB**.
17	Biphasic (BTE) fault or unknown energy: a. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary. b. **Replace A22 Biphasic PCB** or **Replace A04 Therapy PCB**.

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Corrective Action Codes *(continued)*

Corrective Action Code	Description
18	Defibrillator configuration error: a. **Replace A04 Therapy PCB** or **Replace A22 Biphasic PCB** or **Replace A01 System PCB**. b. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary.
19	Dump error code (a02c): a. **Replace A04 Therapy PCB** or **Replace A22 Biphasic PCB** or **Replace A01 System PCB**. b. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary.
20	ECG error: a. Complete the **TCP – ECG Calibration** procedure, and then conduct **PIP**. b. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary. c. **Replace A01 System PCB**.

(Continued on next page)

Corrective Action Codes *(continued)*

Corrective Action Code	Description
21	**Replace A01 System PCB** or **Replace A02 Memory PCB**.
22	NIBP system error: a. Possible transient from input power (**Clear Error**, conduct **PIP**). b. Possible loose cable (check cable between A21 NIBP module and A06 OEM PCB). c. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary. d. **Replace A21 NIBP Module**. e. **Replace A06 OEM PCB**. f. **Replace A01 System PCB**.
23	CO2 system error: a. Possible transient from input power (**Clear Error**, conduct **PIP**). b. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary. c. **Replace A23 EtCO2 Module**. d. **Replace A06 OEM PCB**. e. **Replace A01 System PCB**.

(Continued on next page)

Corrective Action Codes *(continued)*

Corrective Action Code	Description
24	a. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary. b. **Replace A01 System PCB**.
25	a. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary. b. **Replace A22 Biphasic PCB**.
26	Therapy hardware/software mismatch: a. Check the software version of your defibrillator/monitor. Press the ON button to turn device power off, and then press the ON button again. Note the software version displayed on the copyright screen. b. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary. c. **Replace A04 Therapy PCB**.

(Continued on next page)

Corrective Action Codes *(continued)*

Corrective Action Code	Description
27	a. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary. b. **Replace A04 Therapy PCB**.
28	System Software upgrade is recommended, contact **Medtronic Field Service**.
29	Possible transient from input power: a. Turn off the device. b. Disconnect the defibrillator/monitor from line power. c. Investigate power system grounding. d. Call Medtronic Technical Support.
30	Possible therapy processor reset condition. If operating the LIFEPAK 12 defibrillator/monitor with an AC Power Adapter, wait 2 seconds after disconnecting from line power before turning the defibrillator/monitor on.
31	Clear Data Management memory.

(Continued on next page)

Corrective Action Codes *(continued)*

Corrective Action Code	Description
32	Replace PCMCIA modem card.
33	a. Possible transient from input power (**Clear Error**, conduct **PIP**). b. Replace SpO2 sensor. Check SpO2 connector for integrity. c. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary.
34	Check NIBP calibration.
35	Perform CO2 calibration.

About the SERVICE Indicator

What the SERVICE indicator does

The SERVICE indicator lights when an error code is written to the Error Code Log. Always examine such instances using **Processing Error Codes**.

What the SERVICE indicator does not do

The SERVICE indicator is not used to indicate the presence of errors in the Error Code Log, rather it is used to indicate when errors are written to the Error Code Log. For example, if the SERVICE indicator lights when you turn on the device, it indicates the presence of errors in the Error Code Log. If you turn the device off and then on again and the SERVICE indicator does not light, it does not indicate that there are no error codes in the Error Code Log. You still must review the Error Code Log and resolve what was written there in the first instance.

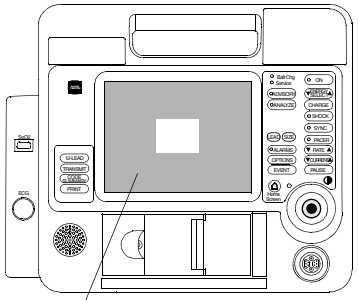
About the Device User Test

When you turn on the device, a series of self-tests occur. If errors are detected, the SERVICE indicator lights. (Refer to **About the SERVICE Indicator**.) Self-testing does not occur only at power-up; rather, it is continuous, repeating over and over again while the device is on. When you use the Selector to navigate to OPTIONS/USER TEST, the device waits until the next self-test cycle is complete and then reports USER TEST PASSES. Note that selecting OPTIONS/USER TEST does not initiate a self-test cycle; rather, it monitors self-test status and makes reports.

One operation is specific to the OPTIONS/USER TEST feature. This operation consists of one cycle of charging the defibrillation capacitor to 10 joules and then dumping the charge. If this operation does not pass, the SERVICE indicator lights and an error is written to the Error Code Log. (Refer to **Processing Error Codes**.)

If the LIFEPAK 12 defibrillator/monitor is used with an AC Power Adapter, wait two seconds after disconnecting from ac line power before turning on the defibrillator/monitor and starting the User Test. This interval gives the device time to complete the transition from the AC Power Adapter to battery power.

Contrast Test—LCD Only

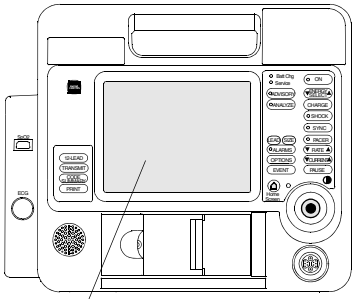


To test screen contrast:

1. Enter the **service mode**.
2. Using the Selector, navigate to SERVICE/TESTS/CONTRAST. The LCD changes to display a square block in the center of the screen.
3. Rotate the Selector. The background changes from pure white to pure black.
4. Select the desired contrast, then press the Selector to exit.
   The SERVICE/TESTS overlay appears.

   Note: If you accidentally select a pure white or pure black background when exiting the contrast test, press the contrast key ◐, rotate the Selector to the desired display, and then press the Selector.
5. Turn off the device or navigate to other service topics, as required.

Pixels Test

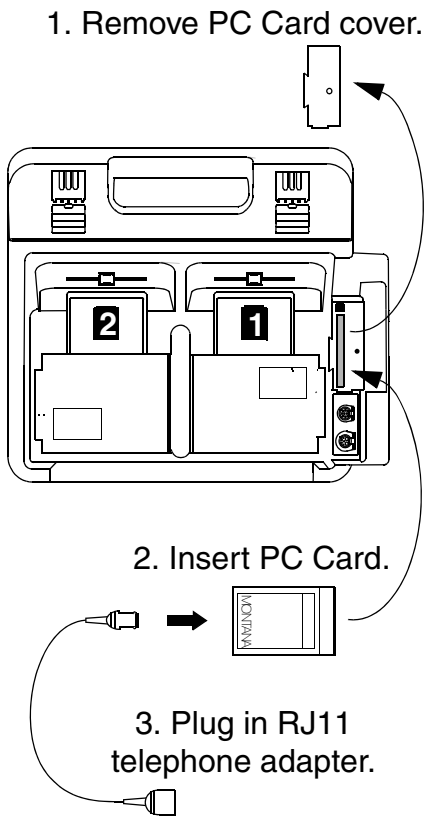


Pixels Display

To test the display pixels:

1. Enter the **service mode**.
2. Using the Selector, navigate to SERVICE/TESTS/PIXELS. The display changes to display a uniformly lighted screen of medium contrast.
3. Carefully examine the screen for any anomalies. After 5 seconds, the message PRESS SELECTOR KNOB TO EXIT appears.
4. Press the Selector. The SERVICE/TESTS overlay appears.
5. Turn off the device or navigate to other service topics, as desired.

PC Card Test



This test checks the ability of the internal PC Card to connect with a remote landline modem. To run this test, you need a telephone number that is answered either by a data modem or by a fax modem. Data modems are associated with a bulletin board service (BBS) or a logon service such as those used by an Internet Service Provider (ISP); fax modems are associated with facsimile machines, which are common to business and personal environments.

Note: This procedure assumes you are using the suggested 3Com® 3CXM556 modem PC Card, Medtronic MIN 3010294-004. If you use any other modem, you must determine the correct AT Command initialization strings.

To install the PC Card and RJ11 telephone adapter:

1. With the device unpowered, remove the Phillips-head screw securing the PC Card cover. Remove the cover by sliding it back and away from the device.
2. Place the PC Card, with the manufacturer's name facing outward and the large connector inward, into the LIFEPAK 12 PC Card slot, and push it into place.
3. Thread the RJ11 telephone cable through the PC card cover and snap it into the x-jack RJ11 connector.

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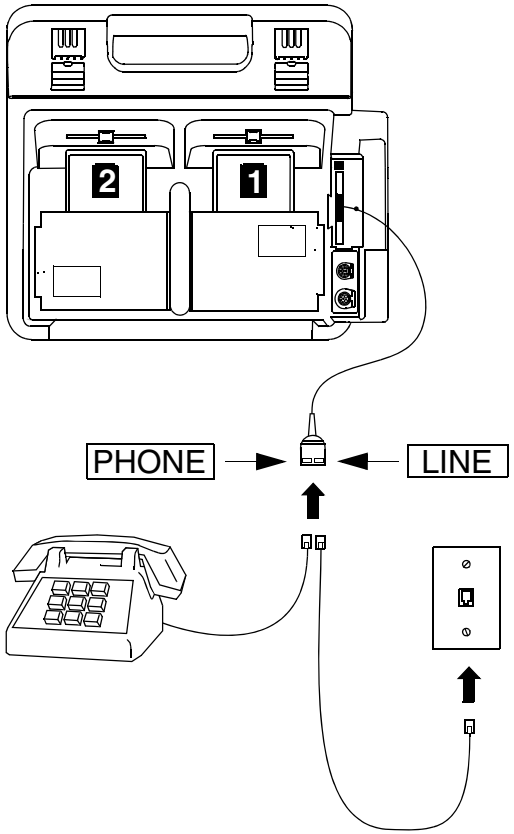
PC Card Test *(continued)*



These steps connect the device/PC Card to the landline telephone system.

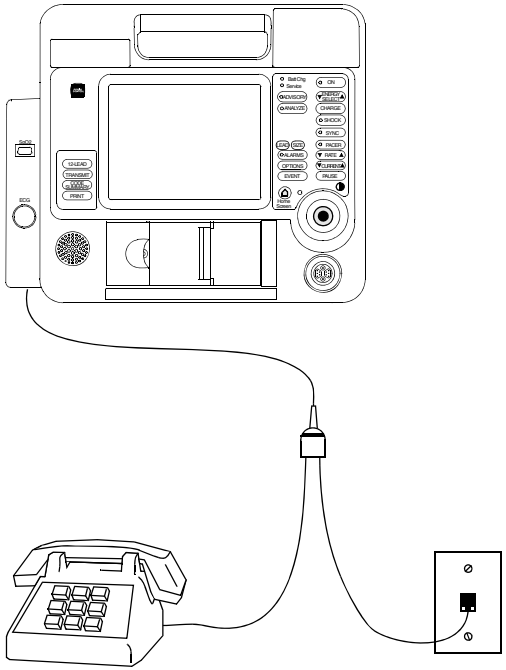
Note: You must connect to an analog telephone outlet, the type used for fax machines and PC modems. Digital telephone outlets often found in large office settings, hotels, and so on will not work.

To connect the device/PC Card to the telephone system:

1. Unplug the telephone and reconnect it to the RJ11 telephone adapter jack labeled PHONE.
2. Connect one end of a standard telephone cable to the RJ11 telephone adapter x-jack and the other end to the telephone outlet.

(Continued on next page)

PC Card Test *(continued)*



To communicate between the device and a remote data modem or fax modem:

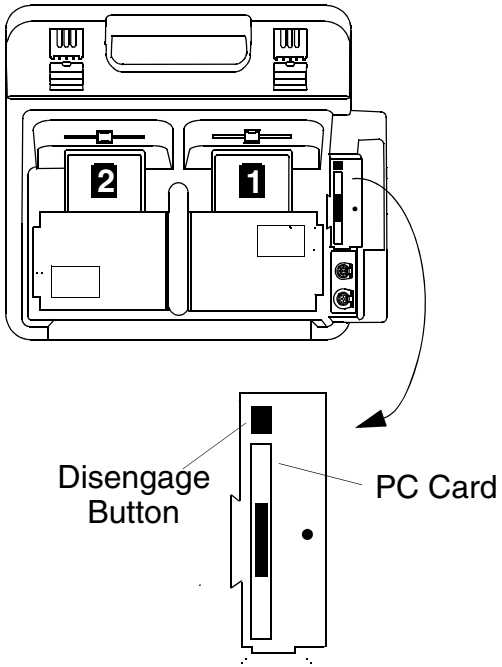
1. Press and hold the OPTIONS and EVENT keys while turning on the device. Hold until the PASSCODE overlay appears. Enter the setup mode passcode **5433**.
2. **Data Modem** Rotate the Selector to TRANSMISSION and press. Use the Selector to navigate to PORTS, then INTERNAL, then EDIT STRING 1. Ensure that the string fields are blank. Press HOME SCREEN.

   Fax Modem Rotate the Selector to TRANSMISSION and press. Use the Selector to navigate to PORTS, then INTERNAL FAX, then EDIT STRING 1. Ensure that string fields are blank. Press HOME SCREEN.
3. Rotate the Selector to TRANSMISSION and press. Use the Selector to navigate to SITES, then SITE 10 (or any unconfigured site). Enter the PHONE # for the remote modem. For example, to dial the telephone number 1 (425) 867-4861, enter 9 and pause two seconds; then enter 14258674861. Do not use PREFIX 1 or PREFIX 2. Continue to the next step with this overlay in the display.
4. **Data Modem** Rotate the Selector to OUTPUT PORT and press. Use the Selector to navigate to INTERNAL. Continue to the next step.

   Fax Modem Rotate the Selector to OUTPUT PORT and press. Use the Selector to navigate to INTERNAL FAX.

(Continued on next page)

PC Card Test *(continued)*



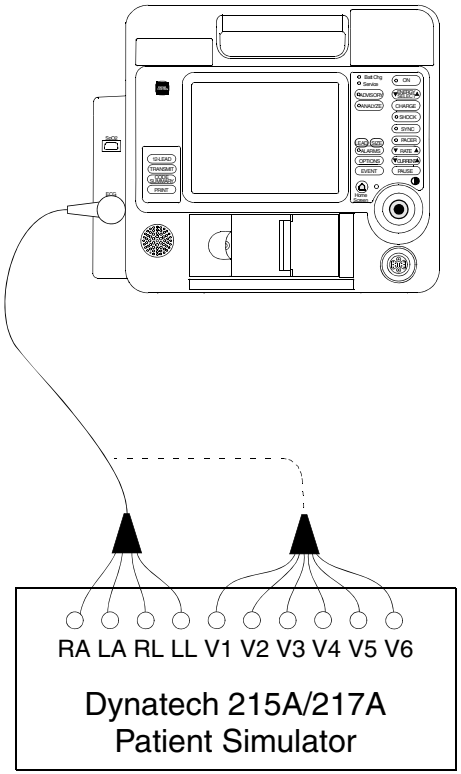
Removing the PC Card

5. Select TEST. The AT Command text appears and, after connection, the text +++ (hang-up) appears, indicating a successful test.

To remove the PC Card from the device:

1. Turn off the LIFEPAK 12 defibrillator/monitor.
2. Remove the RJ11 telephone cable from the PC Card.
3. Push the disengage button just above the PC Card to push the card free of the connector. Remove the PC Card.
4. Reinstall the PC Card cover.
5. Turn off the device or navigate to other service topics, as required.

12-Lead/3-Lead ECG Fast Restore Test



To test 12-Lead/3-Lead ECG fast restore:

1. Reconfigure the test setup (left) by removing the Standard Paddles and connecting an ECG Main Cable to the ECG connector.
2. Connect both the Limb Lead attachment and Precordial attachments to the ECG Main Cable, and connect their corresponding leads to the Dynatech 215A/217A Patient Simulator terminals.
3. Fashion the **Fast Restore Test Fixture** for this test.
4. Turn off the Dynatech 215A/217A Patient Simulator. (No power is applied to the simulator for this test.)
5. Insert a 12-inch tinned test wire under terminal posts LA, RA, LL, and V1 to V6. (See the next page for an illustration.)
6. Connect the test wire LA to the test fixture 350 mV terminal and the test wire RA to the test fixture COM terminal.
7. Rotate the Selector to highlight the Channel 1 (top of the screen) ECG waveform area, and then press the Selector. The CHANNEL 1 overlay appears.
8. Using the Selector, select I for the LEAD, 0.25 for the SIZE, and then press the HOME SCREEN key.

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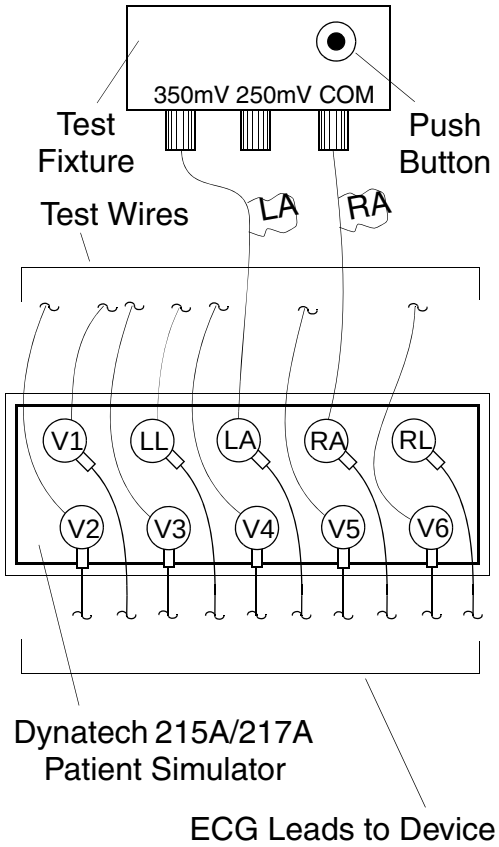
12-Lead/3-Lead ECG Fast Restore Test *(continued)*



9. Press the OPTIONS key. Using the Selector, select PRINTER and then DIAGNOSTIC for the mode. Press the HOME SCREEN key.
10. Press the PRINT key. A printout of ECG Lead I appears (flat line).
11. Press the test fixture pushbutton for 5 seconds, and then release it. The dc step functions appear on the screen and on the printout. Press the PRINT key to stop printing.
12. Confirm that the fast restore time between the start of the dc step function and the return to the flat line is 0.5 seconds (12.5 mm) or less.
13. Move the test wire LA to the test fixture 250 mV terminal.
14. Rotate the Selector to highlight Channel 1 (top of the screen).
15. Using the Selector, select II for the LEAD, and then press the PRINT key.
16. Press the test fixture pushbutton for 5 seconds, and then release it. The dc step functions appear on the printout. Press the PRINT key to stop printing.
17. Confirm that the fast restore time is 0.5 seconds (12.5 mm) or less (next page).
18. Connect the test wires LL, LA, and RA to the test fixture COM terminal. Connect the test wire V1 to the test fixture 250 mV terminal.

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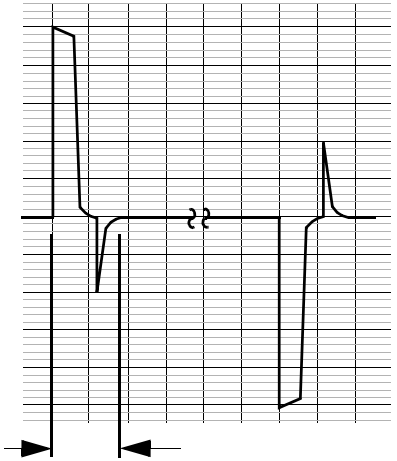
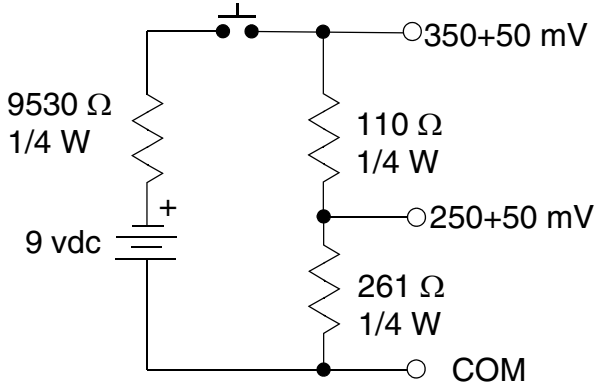
12-Lead/3-Lead ECG Fast Restore Test *(continued)*



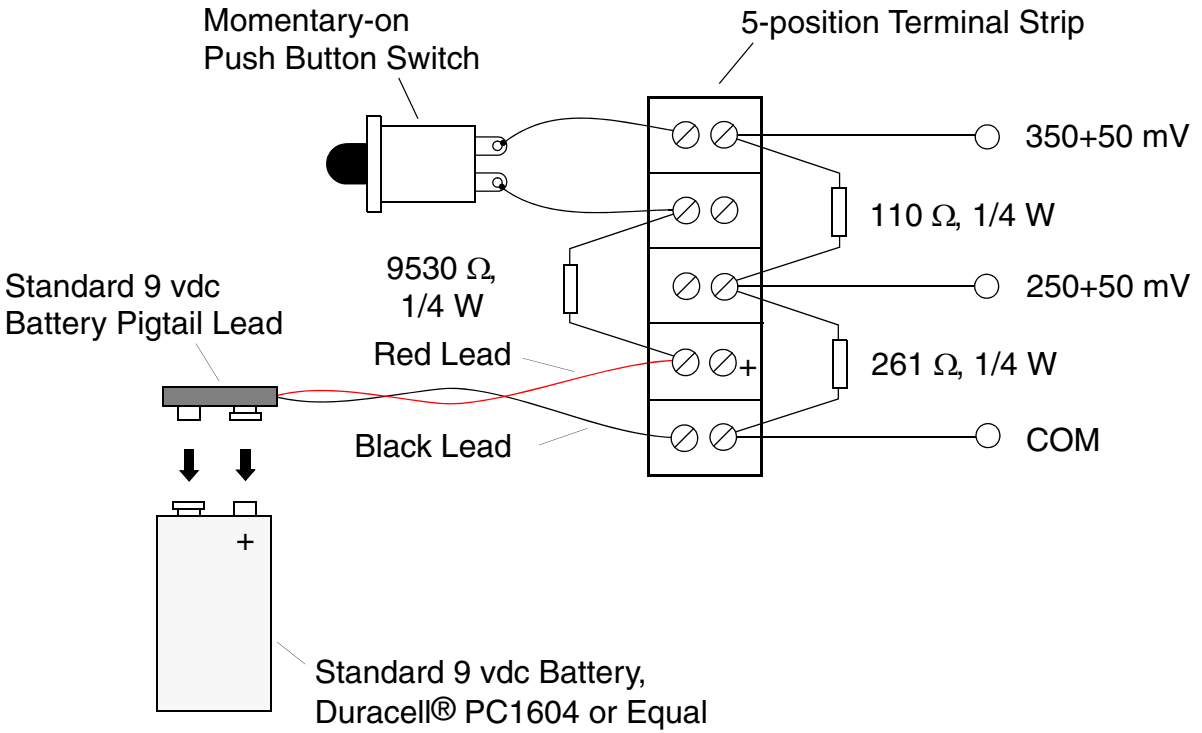
19. Rotate the Selector to highlight Channel 1 (top of the screen).
20. Using the Selector, select V1 for the LEAD, and then press the PRINT key.
21. As before, press/release the test fixture pushbutton, stop printing, and confirm that the fast restore time is 0.5 seconds (12.5 mm) or less.
22. Repeat Steps 18 through 21 for leads V2, V3, V4, V5, and V6.
23. Disconnect the test wires from the Dynatech 215A/217A Patient Simulator and the ECG cable from the device.
24. Turn off the device or navigate to other service topics, as required.

Fast Restore Test Fixture

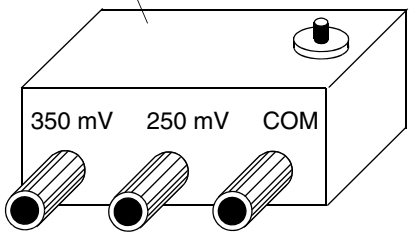
The Fast Restore Test Fixture is used in the **12-Lead/3-Lead ECG Fast Restore Test**. The purpose of the fixture is to inject a dc voltage of 250 mV or 350 mV into test combinations of the ECG 12-lead terminals.



Schematic Diagram



Packaging Suggestion



Preventive Maintenance

Periodic maintenance, inspection, and testing of the LIFEPAK 12 defibrillator/monitor helps prevent and detect possible electrical and mechanical problems. When scheduled maintenance is due, a screen message MAINTENANCE DUE is displayed for 10 minutes each time the device is turned on. Use the **Setting the Maintenance Prompt Interval** and **Resetting the Maintenance Prompt Interval** procedures to set a new interval or to reset the maintenance interval.

For information about battery charging, conditioning, and battery-related topics, refer to **Battery Maintenance**. The information in this section includes the following:

Setting the Maintenance Prompt Interval

You can set up the device to display the screen message MAINTENANCE DUE for a selected interval (for example, 6 months). When this interval time is reached, the message appears continuously for 10 minutes each time the device is turned on. The factory default maintenance prompt interval is OFF. This procedure is used for changing the maintenance prompt interval only.

To clear the MAINTENANCE DUE message, complete the **Resetting the Maintenance Prompt Interval** procedure.

To change the scheduled maintenance interval:

1. Enter the **service mode**.
2. From the SERVICE menu, select MAINT PROMPT to display the SERVICE/MAINT PROMPT menu, including the NEXT PROMPT date for scheduled maintenance.
3. Select INTERVAL. The interval choices of OFF, 3 MONTHS, 6 MONTHS, and 12 MONTHS appear.
4. Select the desired interval.
5. Turn off the device.

Resetting the Maintenance Prompt Interval

After completing scheduled maintenance, reset the maintenance prompt interval counter to clear the MAINTENANCE DUE message and begin the count for the next scheduled maintenance.

To reset the scheduled maintenance interval:

1. Enter the **service mode**.
2. From the SERVICE menu, select MAINT PROMPT to display the SERVICE/MAINT PROMPT menu, including the NEXT PROMPT date for scheduled maintenance.
3. Select RESET. The NEXT PROMPT date is revised to the new scheduled maintenance date.
4. Turn off the device.

Preventive Maintenance and Testing Schedule

Introduction

Periodic maintenance, inspection, and testing of the device will help prevent possible electrical and mechanical problems. Refer to the LIFEPAK 12 Defibrillator/Monitor Series **operating instructions – Operator Checklist** for additional items.

Guidelines

The following table shows the schedule for preventive maintenance activities. For items that should be replaced at regular intervals, refer to **Scheduled Replacement Items**.

Activity	Daily	As Needed	12 Months
Performance Inspection Procedures (PIP)		•	•
Test and Calibration Procedures (TCP)		•	
Exterior Physical Inspection	•		•
Interior Physical Inspection		•	
Exterior Cleaning		•	•
Interior Cleaning		•	

Scheduled Replacement Items

Introduction

There are several items that should be replaced at regular intervals because of their finite life span.

The **Battery Pin Replacement** procedure ensures that the batteries continue to make good connection with the device.

The **Coin Battery Replacement** procedure ensures that the device will not lose battery power for the real-time clock and the 32kx8 NVRAM, which stores the device counters, manufacturing codes, calibration data, user setup configuration and other related device parameters.

Replace the 3-Lead ECG and 12-Lead ECG cables every 2 years to ensure the continued performance of these items.

Replacement Items

The following table shows the schedule for replacement items.

Replacement Item	Frequency
Replace Battery Pins	2 years
Replace ECG Cable	2 years
Replace Therapy Cables	2 years
Replace Coin (Clock) Battery	5 years

Device Useful Life

During product development, the LIFEPAK 12 defibrillator/monitor and subassemblies are subjected to rigorous life testing. This testing and the routine testing and maintenance program recommended in this service manual will help provide reliable device operation for many years.

However, both rapid technological changes and the availability of replacement parts limit the useful life of all modern medical devices. The American Hospital Association suggests a 5-year useful life expectancy for defibrillators (*Estimated Useful Lives of Depreciable Hospital Assets, Revised 1993 Edition*). Similarly, the US Army lists an 8-year life expectancy for defibrillators (technical bulletin: *Maintenance Expenditure Limits for Medical Materiel, TB MED 7 Revision 8 October 1993*). Medtronic recommends that you adopt an 8-year useful life expectancy for this device.

Device Support Policy

Medtronic provides full technical subassembly-level support and subassembly replacement parts for a period of 8 years from the date of shipment from our manufacturing facility. After this 8-year period, Medtronic provides technical support and subassembly replacement parts as available.

Cleaning

Tools and Materials

The tools and materials that you will need to perform an external and internal cleaning of the LIFEPAK 12 defibrillator/monitor are shown below.

Product	Description
Static discharge protected work area	Grounded conductive surface and wrist strap
Isopropyl alcohol	
Soap and water	
Quaternary ammonium compounds	
Peroxide (peracetic acid) solutions	
Cotton swabs	
Vacuum cleaner	
Soft-bristle brush	Nonmetallic
Cloth	Clean and lint-free
Compressed air	Clean and dry (60 psi, max.)

(Continued on next page)

Cleaning *(continued)*

External Cleaning Procedures

WARNING!

Shock or fire hazard. Do not immerse or soak any portion of this device in water or any other fluid. Avoid spilling any fluid on the device or accessories.

CAUTION!

Possible case damage. Do not clean any part of this device or accessories with bleach, bleach dilution, or phenolic compounds. Do not use abrasive or flammable cleaning agents. Do not attempt to sterilize this device or any accessories unless otherwise specified in accessory operating instructions.

Clean the exterior of the LIFEPAK 12 defibrillator/monitor by wiping the surface with any of the following solutions:

- Soap and water
- Quaternary ammonium compounds
- Isopropyl alcohol
- Peroxide (peracetic acid) solutions

(Continued on next page)

Cleaning *(continued)*

Internal Cleaning Procedures

WARNING!

Shock hazard. The Energy Storage Capacitor carries high voltage. Remove the battery and discharge the capacitor before handling.

CAUTION!

Possible case damage. Do not clean any part of this device or accessories with bleach, bleach dilution, or phenolic compounds. Do not use abrasive or flammable cleaning agents. Do not attempt to sterilize this device or any accessories unless otherwise specified in accessory operating instructions.

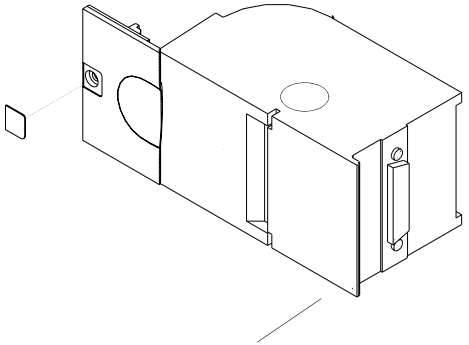
Clean the interior of the LIFEPAK 12 defibrillator/monitor as described below.

1. Brush interior surfaces and parts with a nonmetallic soft-bristle brush.
2. Remove loosened dirt and dust using a vacuum or dry, low-pressure compressed air (60 psi) cleaner.
3. Wipe metal surfaces with a soft, nonabrasive cloth that has been dampened with isopropyl alcohol.

Storage

When the LIFEPAK 12 defibrillator/monitor is not in use, store at temperatures between 0° and +35° C (+32° and +95° F) if batteries are installed, or -20° and +60° C (-4° and +140° F) if no batteries are installed.

A12 Printer (50 mm) Maintenance



A12 Printer (50 mm)

This section provides general maintenance information for the A12 Printer (50 mm). Also refer to the **A12 Printer (50 mm) Assembly Drawing** and the **A12 Printer (50 mm) Parts List** to locate parts specified in these procedures. Only the listed parts are available for replacement. Other parts are shown for reference only.

(Continued on next page)

A12 Printer (50 mm) Maintenance *(continued)*

Printroller Cleaning

To remove paper debris and other residue from the printroller, soak a cotton swab with alcohol and wipe across the roller surface.

Printhead Cleaning

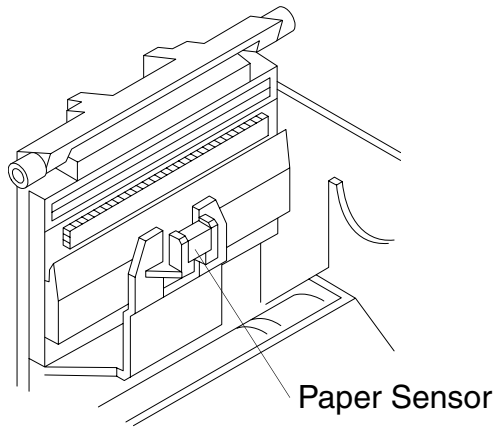
Clean the printhead after using approximately 100 rolls of chart paper or more often if needed. Use a cotton swab soaked in clean isopropyl alcohol.

1. Turn off the device. Locate the printhead between the two brushes on the upper half of the printer.
2. Wipe the surface of the printhead clean with the alcohol-soaked cotton swab, allowing only the cotton tip of the swab to contact the printhead.

Paper Sensor Cleaning

The paper sensor also requires periodic cleaning to prevent paper debris from blocking the infrared signals that reflect off the paper during normal operation.

Clean the sensor whenever the printhead is cleaned. Use a clean cotton swab soaked in clean isopropyl alcohol. Gently wipe the surface of the paper sensor with the tip of the swab.



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A12 Printer (50 mm) Maintenance *(continued)*

Printhead Adjustment Procedure

Changes in printhead up/down alignment can cause changes in print image quality. Use the following procedure to adjust the printhead for optimum print quality. Make sure the power is off before beginning this procedure.

1. Remove the screws from the A12 Printer (50 mm). (Refer to the **A12 Printer (50 mm) Assembly Replacement** procedure.)
2. Install a roll of printer paper in the printer.
3. Turn on the LIFEPAK 12 defibrillator/monitor and conduct the **TCP – Printer Calibration** procedure.
4. Select START, and then press the Selector. A test strip prints showing horizontal tick marks. Observe the quality of the printed marks. If the printout is satisfactory, press SELECTER and skip to step 9. If the printout is notsatisfactory, continue with step 5 to adjust the printhead.
5. Turn off the defibrillator.
6. Remove the printer from the defibrillator.
7. Open the printer door and locate the pivot screw on the bottom rear surface.

(Continued on next page)

A12 Printer (50 mm) Maintenance *(continued)*

Printhead Adjustment Procedure (continued)

8. Using a Phillips screwdriver, slightly tighten or loosen the pivot screw to adjust the printhead.
9. Close the printer door and repeat step 4 to print another test strip to confirm print quality changes. Adjust as required until optimum print quality is achieved.
10. Turn off the defibrillator and reinstall the printer.

A12 Printer (100 mm) Maintenance

Refer to **A12 Printer (50mm) Maintenance** for general cleaning information for the A12 Printer (100mm). Printhead adjustment is not necessary and does not apply to the A12 Printer (100mm).

Refer to the **A12 Printer (100 mm) Parts List** to locate parts specified in these procedures. Only the listed parts are available for replacement.

(Continued on next page)

A12 Printer (100 mm) Maintenance *(continued)*

Printroller Cleaning

To remove paper debris and other residue from the printroller, soak a cotton swab with alcohol and wipe across the roller surface.

Printhead Cleaning

Clean the printhead after using approximately 100 rolls of chart paper or more often if needed. Use a cotton swab soaked in clean isopropyl alcohol.

1. Turn off the device. Locate the printhead between the two brushes on the upper half of the printer.
2. Wipe the surface of the printhead clean with the alcohol-soaked cotton swab, allowing only the cotton tip of the swab to contact the printhead.

Paper Sensor Cleaning

The paper sensor also requires periodic cleaning to prevent paper debris from blocking the infrared signals that reflect off the paper during normal operation. See below for the location of the paper sensor.

Clean the sensor whenever the printhead is cleaned. Use a clean cotton swab soaked in clean isopropyl alcohol. Gently wipe the surface of the paper sensor with the tip of the swab.

Battery Maintenance

Follow the guidelines described in this section to help maximize battery life and performance.

For information about the Battery Support System 2, refer to the **Battery Support System 2 Operating Instructions – Basic Orientation.** For information about the Mobile Battery Service Station (supplied by TMS Medical Technologies), refer to the Mobile Battery Service Station User's Manual.

Note: Unless otherwise specified, the information in this section applies only to batteries and their maintenance using the Battery Support System 2 or Mobile Battery Service Station.

Battery General Characteristics

Types of Batteries

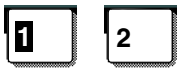
The LIFEPAK 12 defibrillator/monitor can be powered by four types of batteries:

- FASTPAK rechargeable battery
- FASTPAK 2 rechargeable battery with fuel gauge
- LIFEPAK NiCd rechargeable battery with fuel gauge
- LIFEPAK SLA (Sealed Lead-Acid) rechargeable battery

You may use any combination of batteries in the device. To compare the batteries by appearance, see the **Battery Outlines** illustration.

Battery Icons

The LIFEPAK 12 defibrillator/monitor displays two battery condition icons: battery available and battery discharged. For example:



Batteries 1 and 2 have available charge, and the device is operating from Battery 1.

Battery 1 has discharged, and the device is now operating from Battery 2. A BATTERY 1 LOW message appears.

Batteries 1 and 2 have discharged, and the device has switched back to Battery 1. A REPLACE BATTERY message appears.

When all battery capacity is exhausted, the device turns off. If you insert a fresh battery and repower the device in less than 30 seconds, the device retains its settings. For more information, refer to **Battery Performance Characteristics**.

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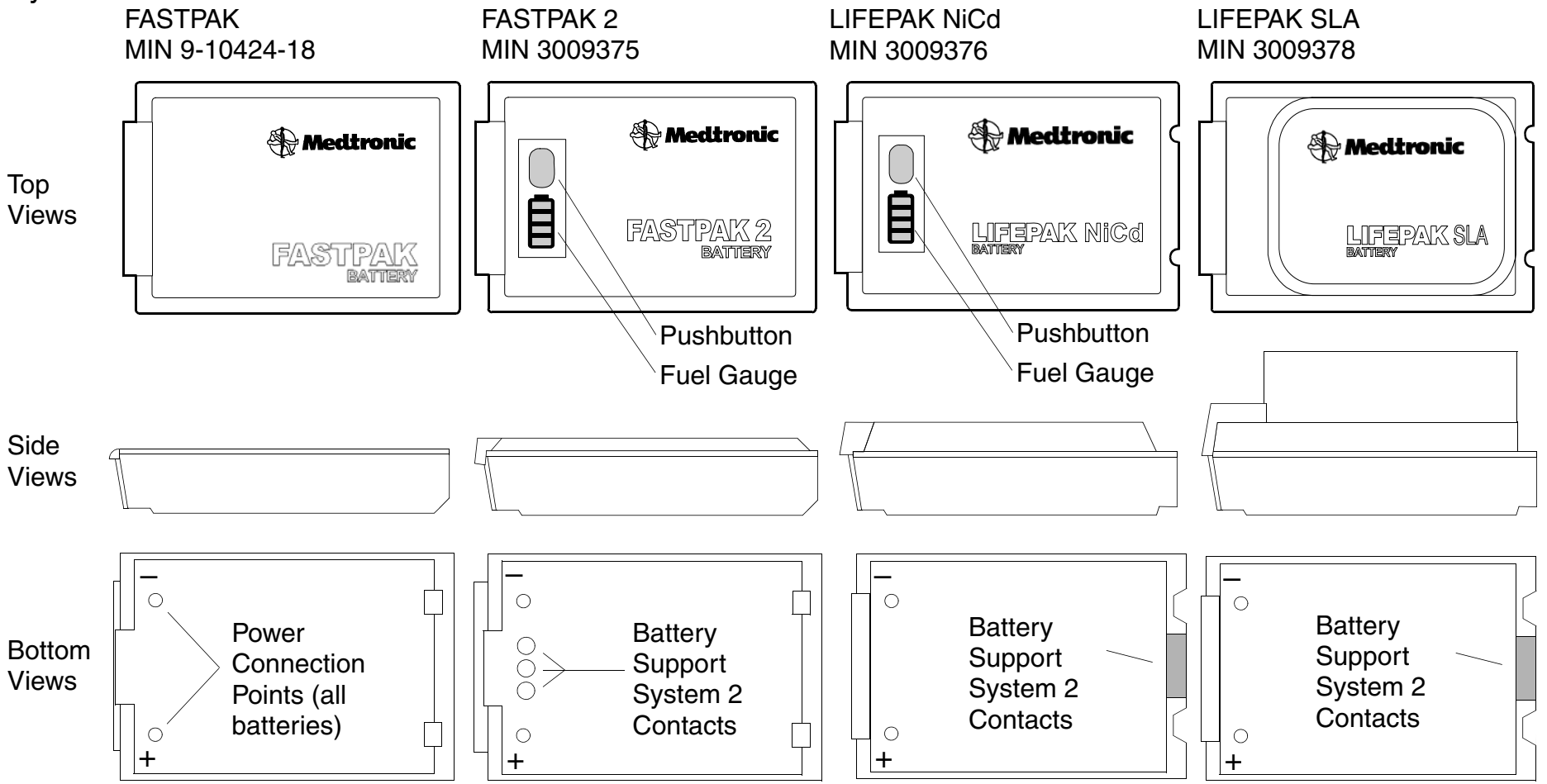
(Continued on next page)

Battery General Characteristics *(continued)*

Battery Outlines



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Battery General Characteristics *(continued)*

FASTPAK Battery

Properly maintained, FASTPAK batteries have a useful life of approximately 2 years. The FASTPAK battery functions identically to the FASTPAK 2 battery and is compatible with the LIFEPAK 5, LIFEPAK 10, and LIFEPAK 11 products. However, the FASTPAK battery does not have a pushbutton fuel gauge and cannot communicate with the Battery Support System 2 or Mobile Battery Service Station.

The FASTPAK battery can be charged in a Battery Support System 2, Mobile Battery Service Station, or the LIFEPAK 12 defibrillator/monitor when the device is powered by an external power adapter.

Note: While it is permissible to charge the FASTPAK battery in the original Battery Support System, it is beyond the scope of this manual to describe this process.

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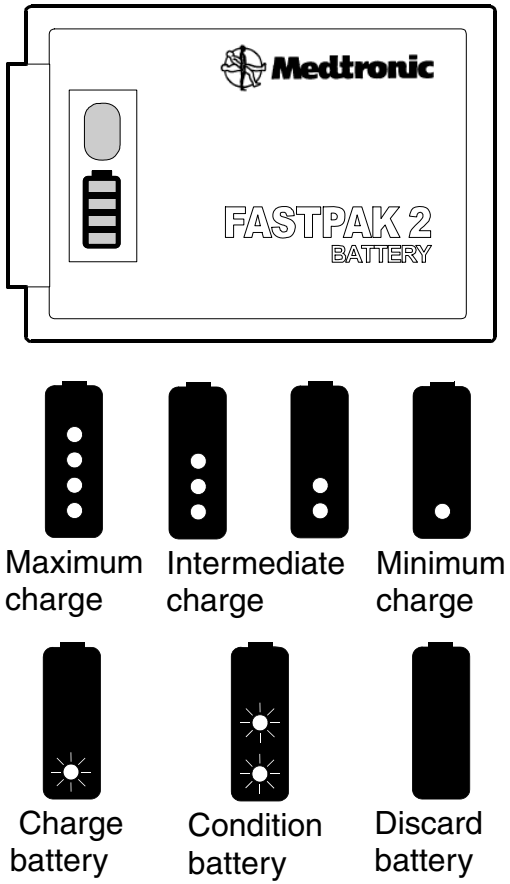
Battery General Characteristics *(continued)*

FASTPAK 2 Battery



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The FASTPAK 2 NiCd battery functions identically to the FASTPAK battery and is compatible with the LIFEPAK 5, LIFEPAK 10, and LIFEPAK 11 products. The only differences between the two batteries are that the FASTPAK 2 battery has a pushbutton fuel gauge and the ability to communicate with the Battery Support System 2 and Mobile Battery Service Station.

When you press the FASTPAK 2 pushbutton, a series of four green LEDs light in a pattern that indicates the relative battery capacity and battery condition.

- One to four LEDs indicate the relative charge of the battery, with four lights indicating maximum charge.
- One LED flashing: **Charge the battery**.
- Two LEDs flashing alternately: **Condition the battery**.
- No LEDs in display: battery has 0% charge or needs to be discarded.

CAUTION!

Possible inaccurate battery charge indicator. Using the Battery Support System (MIN 801807) or the two-well Battery Charger (MIN 9-00284, 9-00288, and 801350) to charge and maintain a FASTPAK 2 battery will eventually result in an inaccurate battery charge level indicator. Use only the Battery Support System 2 (MIN 3010035) or Mobile Battery Service Station (MIN 3202539) to charge and maintain FASTPAK 2 batteries.

(Continued on next page)

Battery General Characteristics *(continued)*

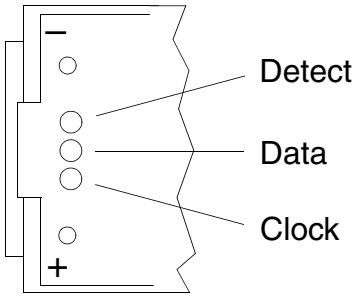
FASTPAK 2 Battery (continued)

Properly maintained, FASTPAK 2 batteries have a useful life of up to 5 years. However, the FASTPAK 2 battery has internal parameters that establish useful life (that is, the battery may reach end-of-life in less than 5 years). You should **discard/recycle** the FASTPAK 2 battery when it:

- Has been charged/discharged more than 750 times.
- Reaches 5 years of age.
- Displays a DISCARD message in the Battery Support System 2.
- Has an amp/Hr characteristic below minimum standards (for example, the rated 1.2 amp/Hr value is below 0.9 ah).
- Has discharged to a level of 4.5 vdc, or less.

The FASTPAK 2 battery incorporates internal circuitry for communication with the Battery Support System 2 and Mobile Battery Service Station through connections within the bottom of the battery. The FASTPAK 2 battery communicates through contacts located on the bottom of the battery. They allow the exchange of information about battery type, amp/Hr rating, charge rate, target voltage, current, and other parameters.

FASTPAK 2 batteries can be charged and conditioned only by using the Battery Support System 2 or Mobile Battery Service Station. Shelf-life test can also be performed in the Battery Support System 2. The LIFEPAK 12 defibrillator/monitor, when powered by an external power adapter, can only charge FASTPAK 2 batteries.



BBS 2 Battery Contacts

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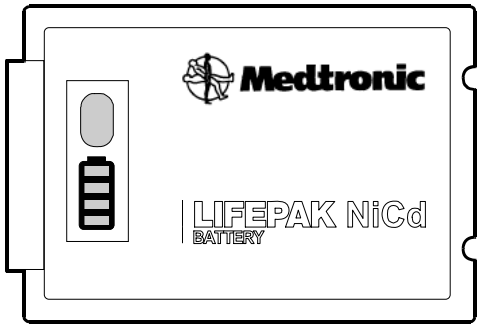
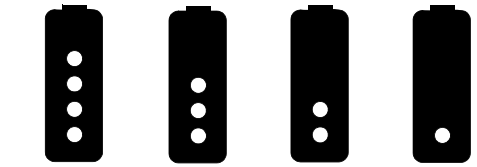
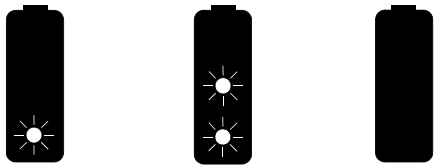
Battery General Characteristics *(continued)*

LIFEPAK NiCd Battery





Maximum charge | Intermediate charge | Minimum charge



Charge battery | Condition battery | Discard battery

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The LIFEPAK 2 battery has a pushbutton fuel gauge and the ability to communicate with the Battery Support System 2 or Mobile Battery Service Station.

When you press the LIFEPAK NiCd pushbutton, a series of four green LEDs light in a pattern that indicates the relative battery capacity and battery condition.

- One to four LEDs indicate the relative charge of the battery, with four lights indicating maximum charge.
- One LED flashing: **Charge the battery**.
- Two LEDs flashing alternately: **Condition the battery**.
- No LEDs in display: battery has 0% charge and should be discarded/recycled.

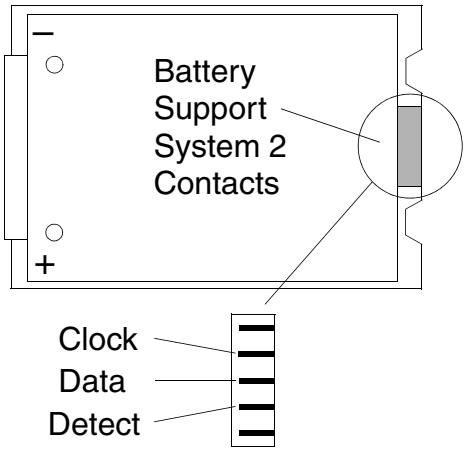
Note: The LIFEPAK NiCd battery is available in 1.7 amp/Hr and 2.4 amp/Hr versions. The duration of Charge, Condition, and Shelf-Life cycles depends upon the capacity of the battery used.

CAUTION!

Possible inaccurate battery charge indicator. Using the Battery Support System (MIN 801807) or the two-well Battery Charger (MINs 9-00284, 9-00288, and 801350) to charge and maintain a LIFEPAK NiCd battery will eventually result in an inaccurate battery charge level indicator. Use only the Battery Support System 2 (MIN 3010035) or Mobile Battery Service Station (MIN 3202539) to charge and maintain LIFEPAK NiCd batteries.

Battery General Characteristics *(continued)*

LIFEPAK NiCd Battery (continued)



Properly maintained, LIFEPAK NiCd batteries have a useful life of approximately 5 years. However, the LIFEPAK NiCd has internal parameters that establish useful life (i.e., the battery may reach end-of-life in less than 5 years). You should **discard/recycle** the LIFEPAK NiCd battery when it:

- Reaches 5 years of age.
- Displays a DISCARD message in the Battery Support System 2.
- Has an amp/Hr characteristic below minimum standards (for example, the rated 1.7 amp/Hr value is below 1.3 amp/Hr).
- Has discharged to a level of 4.5 vdc, or less.

The LIFEPAK NiCd battery incorporates internal circuitry for communication with the Battery Support System 2, Mobile Battery Service Station, and the LIFEPAK 12 defibrillator/monitor. The LIFEPAK NiCd battery communicates through contacts in a blade connector located on the bottom of the battery. They allow the exchange of information about battery type, amp/Hr rating, charge rate, target voltage, current, and other parameters.

LIFEPAK NiCd can be charged and conditioned only by using the Battery Support System 2 or Mobile Battery Service Station. Shelf-life test can also be performed in the Battery Support System 2. The LIFEPAK 12 defibrillator/monitor, when powered by an external power adapter, can only charge LIFEPAK NiCd batteries.

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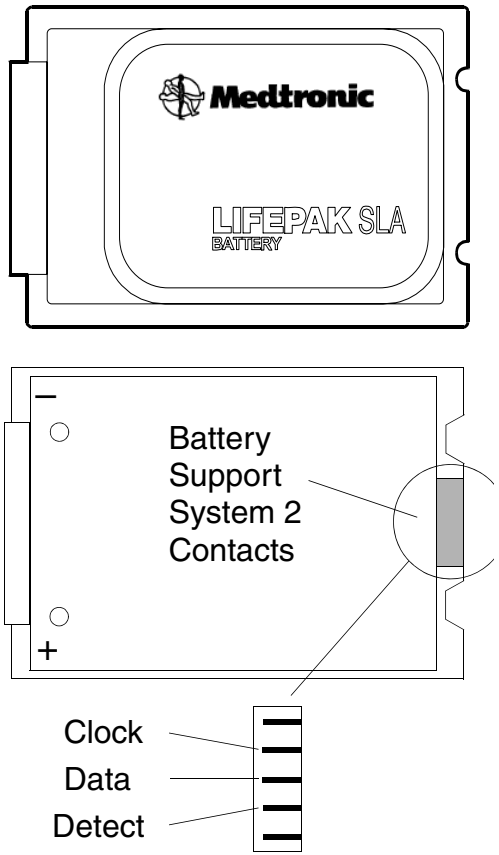
Battery General Characteristics *(continued)*

LIFEPAK SLA Battery



Properly maintained, LIFEPAK SLA batteries have a useful life of up to 3 years. However, the LIFEPAK SLA battery has internal parameters that establish useful life (that is, the battery may reach end-of-life in less than 3 years). You should **discard/recycle** the LIFEPAK SLA battery when it:

- Has been charged/discharged more than 100 times.
- Reaches 3 years of age.
- Displays a DISCARD message in the Battery Support System 2.
- Has an amp/Hr characteristic below minimum standards (for example, the rated 2.5 amp/Hr value is below 1.9 amp/Hr).
- Has discharged to a level of 4.5 vdc, or less.

The LIFEPAK SLA battery incorporates internal circuitry for communication with the Battery Support System 2, Mobile Battery Service Station, and LIFEPAK 12 defibrillator/monitor. The LIFEPAK SLA battery communicates through contacts in a blade connector located on the bottom of the battery. These contacts allow the exchange of information about battery type, amp/Hr rating, charge rate, target voltage, current, and other parameters.

The LIFEPAK SLA battery can be charged by the Battery Support System 2, Mobile Battery Service Station, or LIFEPAK 12 defibrillator/monitor with the external power adapter. The Battery Support System 2 may be used to perform shelf-life test on SLA batteries. SLA batteries, unlike NiCd batteries, do not require periodic conditioning.

Battery Performance Characteristics

NiCd Battery Performance Factors

There are three major factors that affect NiCd battery performance:

- Temperature – Charging batteries at a room temperature of 20°C to 25°C (68°F to 78°F) is preferred to maximize battery performance and life. The extreme temperature range for charging batteries is 5°C to 35°C (41°F to 95°F).

CAUTION!

Possible battery damage. Charging a battery at temperatures below 5°C (41°F) or above 35°C (95°F) will prevent the battery from reaching its full capacity and may lead to irreversible cell damage.

- Voltage Depression – A condition that reduces battery performance. When NiCd batteries repeatedly receive a shallow discharge (that is, are not allowed to drain completely between charging cycles), voltage depression occurs. Voltage depression can usually be reversed by conditioning a battery every 3 months.

  Voltage depression is often mistakenly called “Memory.”

- Discharge Rate – Batteries discharge when not used. A new NiCd battery discharges approximately 1% of its capacity each day when stored at room temperature. In 10 days, a new NiCd battery not installed in the defibrillator loses approximately 10% of its capacity.

(Continued on next page)

Battery Performance Characteristics *(continued)*

NiCd Battery Performance Factors (continued)

Use the Battery Support System 2 to evaluate the discharge rate of a FASTPAK battery by performing the **shelf-life** test.

The actual battery discharge rate depends on:

- Battery age
- Temperature
- Frequency of use
- Length of time in storage
- Physical battery condition

These factors can combine to significantly increase the battery discharge rate. For example, an older battery stored in higher temperatures may have an accelerated discharge rate much greater than 1% a day.

The discharge rate increases as the battery ages.

The typical charge time for fully depleted FASTPAK and FASTPAK 2 batteries in the Battery Support System 2 is 1.5 hours, or less. New FASTPAK and FASTPAK 2 batteries undergo a forming process that may extend charge time for a fully depleted battery beyond 1.5 hours for the first 10 charge cycles.

(Continued on next page)

Battery Performance Characteristics *(continued)*

SLA Battery Performance Factors

There are three major factors that affect SLA battery performance:

- Storage – Storing an SLA battery that is less than 100% charged can result in permanent damage.
- Undercharging – Fully charge SLA batteries between uses.

  If SLA batteries are not 100% recharged between uses, sulfation (lead sulfate buildup on electrode surfaces inside the battery) can occur. Sulfation reduces battery capacity and may result in premature battery failure.
- Discharge Rate – SLA batteries have a low discharge rate. A new SLA battery discharges approximately 0.1% of its capacity each day when stored at room temperature. In 10 days, a new SLA battery loses approximately 1.0% of its capacity.

  The actual battery discharge rate depends on:

  – Battery age
  – Temperature
  – Frequency of use
  – Length of time in storage
  – Physical battery condition

  The discharge rate increases as the battery ages.

(Continued on next page)

Battery Performance Characteristics *(continued)*

Battery Performance Comparison

The following table compares the performance characteristics of the FASTPAK, FASTPAK 2, FASTPAK NiCd, and LIFEPAK SLA batteries (at 20°C).

Operating Conditions	Total Operating Duration				Duration After Low Battery Alert			
	Typical		Minimum		Typical		Minimum	
	LCD	EL	LCD	EL	LCD	EL	LCD	EL
Monitoring (minutes)								
FASTPAK/ FASTPAK 2 NiCd	110	81	60	43	10	6	2	1
LIFEPAK NiCd (1.7amp/Hr)	155	114	85	62	14	8	2	1
LIFEPAK NiCd (2.4 amp/Hr)	220	162	120	86	20	12	4	2
LIFEPAK SLA	180	132	100	73	16	10	2	1
Monitoring/Pacing (minutes at 100 ma, 60 ppm)								
FASTPAK/ FASTPAK 2 NiCd	105	75	60	42	9	6	2	1
LIFEPAK NiCd	145	104	85	60	12	8	2	1
LIFEPAK NiCd (2.4 amp/Hr)	210	150	120	84	18	12	4	2
LIFEPAK SLA	170	122	100	71	14	10	2	1

(Continued on next page)

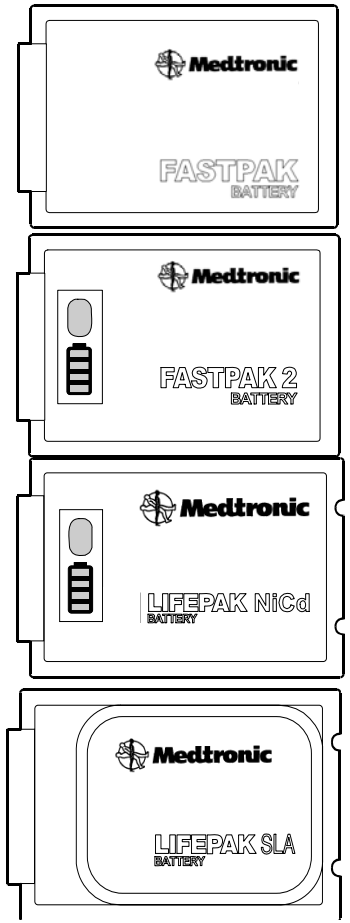
Battery Performance Characteristics *(continued)*

Battery Performance Comparison (continued)

Operating Conditions	Total Operating Duration				Duration After Low Battery Alert			
	Typical		Minimum		Typical		Minimum	
	LCD	EL	LCD	EL	LCD	EL	LCD	EL
Defibrillation (360 J discharges)								
FASTPAK/ FASTPAK 2 NiCd	80	72	45	40	7	7	3	3
LIFEPAK NiCd (1.7 amp/Hr)	110	99	60	54	10	10	3	3
LIFEPAK NiCd (2.4 amp/Hr)	160	144	90	80	14	14	6	6
LIFEPAK SLA	145	131	85	76	12	12	3	3

Charging Batteries

Overview



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WARNING!

Possible loss of power and delay of therapy during patient care. Using an improperly maintained battery to power a defibrillator may cause power failure without warning. Use the appropriate Battery Support System to charge and condition batteries.

CAUTION!

Possible inaccurate battery charge indicator. Using the Battery Support System (MIN 801807) or the two-well Battery Charger (MINs 9-00284, 9-00288, and 801350) to charge and maintain a FASTPAK 2 battery will eventually result in an inaccurate battery charge level indicator. Use only the Battery Support System 2 (MIN 3010035) to charge and maintain FASTPAK 2 batteries.

FASTPAK batteries may be charged, conditioned, and tested for shelf-life in the Battery Support System or the Battery Support System 2. FASTPAK 2, LIFEPAK NiCd, and LIFEPAK SLA batteries may be charged, conditioned, and tested for shelf-life in the Battery Support System 2 or Mobile Battery Service Station. The LIFEPAK 12 defibrillator/monitor, when powered by an external power adapter, can only charge batteries.

- **FASTPAK Battery Charging**
- **FASTPAK 2 Battery Charging**
- **LIFEPAK NiCd Battery Charging**
- **LIFEPAK SLA Battery Charging**
- **Battery Charging in the LIFEPAK 12 Defibrillator/Monitor**

Charging Batteries *(continued)*

FASTPAK Battery Charging

The typical charge time for a fully depleted FASTPAK battery in the Battery Support System 2 is 1.5 hours (Mobile Battery Service Station is 25 minutes). To maximize performance and battery life, maintain an ambient temperature for the Battery Support System 2 or Mobile Battery Service Station between 20°C and 25.5°C (68°F and 78°F) when charging a FASTPAK battery.

To charge a FASTPAK battery in the Battery Support System 2 or Mobile Battery Service Station:

1. Place the battery in an open charging bay. The CHARGE indicator illuminates.

   Note: If the DISCARD indicator illuminates, the battery has a voltage of less than 4.5 vdc and cannot be charged. Remove the battery and **discard/recycle**.

2. Remove the charged battery when the READY indicator illuminates, or leave it in the battery charger to maintain the battery at peak capacity.

   Note: If the DISCARD indicator illuminates after recharging, the battery has low capacity. Remove the battery and **discard/recycle**.

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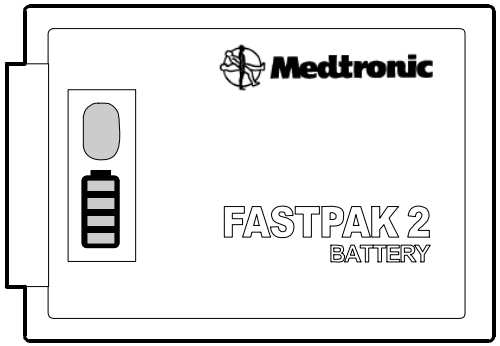
Charging Batteries *(continued)*

FASTPAK 2 Battery Charging



The typical charge time for a fully depleted FASTPAK 2 battery in the Battery Support System 2 is 1.5 hours (Mobile Battery Service Station is 30 minutes). To maximize performance and battery life, maintain an ambient temperature for the Battery Support System 2 or Mobile Battery Service Station between 20°C and 25.5°C (68°F and 78°F) when charging a FASTPAK 2 battery.

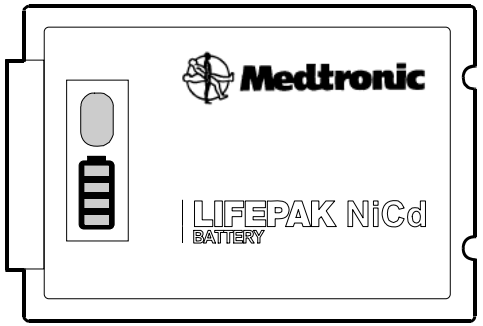
Note: If a FASTPAK 2 battery is charged in the original Battery Support System or the LIFEPAK 12 defibrillator/monitor, the battery fuel gauge will eventually give false indications. To correct this problem, refer to **FASTPAK 2 Battery Conditioning**.

To charge a FASTPAK 2 battery in the Battery Support System 2 or Mobile Battery Service Station:

1. Place the battery in an open charging bay. The CHARGE indicator illuminates.
   Note: If the DISCARD indicator illuminates, the battery has been cycled more than 750 times, is at least 5 years old, has a fault, has low capacity, or has discharged to 4.5 vdc or less. Remove and **discard/recycle** the battery.
   Note: If the CONDITION indicator illuminates instead of the CHARGE indicator, refer to **FASTPAK 2 Battery Conditioning**.
2. Remove the charged battery when the READY indicator illuminates, or leave it in the battery charger to maintain the battery at peak capacity.
   Note: If the DISCARD indicator illuminates after recharging, the battery has low capacity. Remove the battery and **discard/recycle**.

Charging Batteries *(continued)*

LIFEPAK NiCd Battery Charging



The typical charge time for a fully depleted LIFEPAK NiCd battery in a Battery Support System 2 is 2.25 hours (40 minutes in Mobile Battery Service Station) for the 1.7 amp/Hr battery, and 3 hours (60 minutes in Mobile Battery Service Station) for the 2.4 amp/Hr battery. To maximize performance and battery life, maintain an ambient temperature for the Battery Support System 2 or Mobile Battery Service Station between 20° C and 25.5°C (68°F and 78°F) when charging a LIFEPAK NiCd battery.

Note: If a LIFEPAK NiCd battery is charged in the old style Battery Support System or the LIFEPAK 12 defibrillator/monitor, the battery fuel gauge will eventually give false indications. To correct this problem, refer to **LIFEPAK NiCd Battery Conditioning**.

To charge a LIFEPAK NiCd battery in the Battery Support System 2 or Mobile Battery Service Station:

1. Place the battery in an open charging bay. The CHARGE indicator illuminates.
2. Remove the charged battery when the READY indicator illuminates, or leave it in the battery charger to maintain the battery at peak capacity.

   Note: If the DISCARD indicator illuminates after recharging, the battery has low capacity. Remove the battery and **discard/recycle**.

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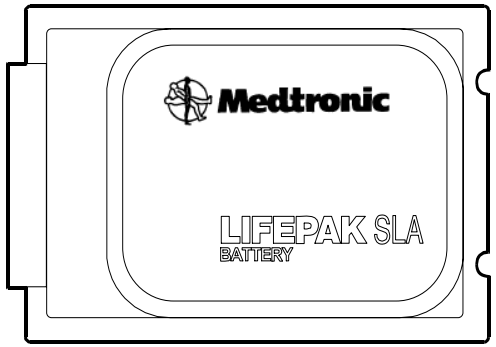
Charging Batteries *(continued)*

LIFEPAK SLA Battery Charging



The typical charge time for a fully depleted LIFEPAK SLA battery in the Battery Support System 2 is 6 hours,12-hour maximum (2.5 hours in Mobile Battery Service Station). To maximize performance and battery life, maintain an ambient temperature for the Battery Support System 2 or Mobile Battery Service Station between 20°C and 25.5°C (68°F and 78°F) when charging a LIFEPAK SLA battery.

To charge a LIFEPAK SLA battery in the Battery Support System 2 or Mobile Battery Service Station:

1. Place the battery in any open charging bay. The CHARGE indicator illuminates.

   Note: If the DISCARD indicator illuminates, the battery has been cycled more than 100 times, is at least 3 years old, has a fault, has low capacity, or has discharged to 4.5 vdc or less. Remove and **discard/recycle** the battery.

   Note: If the CONDITION indicator illuminates instead of the CHARGE indicator, refer to **LIFEPAK SLA Battery Conditioning**.

2. Remove the charged battery when the READY indicator illuminates, or leave it in the battery charger to maintain the battery at peak capacity.

   Note: If the DISCARD indicator illuminates after recharging, the battery has low capacity. Remove the battery and **discard/recycle**.

   Note: The LIFEPAK SLA battery may be charged using the external power adapter only, if desired. The Battery Support System 2 or Mobile Battery Service Station are not required.

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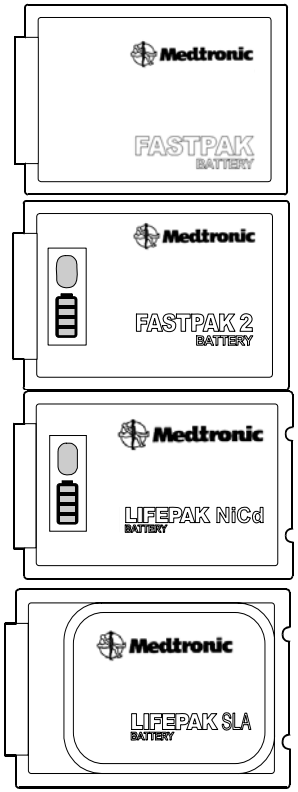
Charging Batteries *(continued)*

Battery Charging in the LIFEPAK 12 Defibrillator/Monitor



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WARNINGS!

Possible device shutdown during patient care. **The ac and dc power adapter trickle-charge batteries; they do not maintain batteries. Maintain batteries with the appropriate Medtronic Battery Support System.**

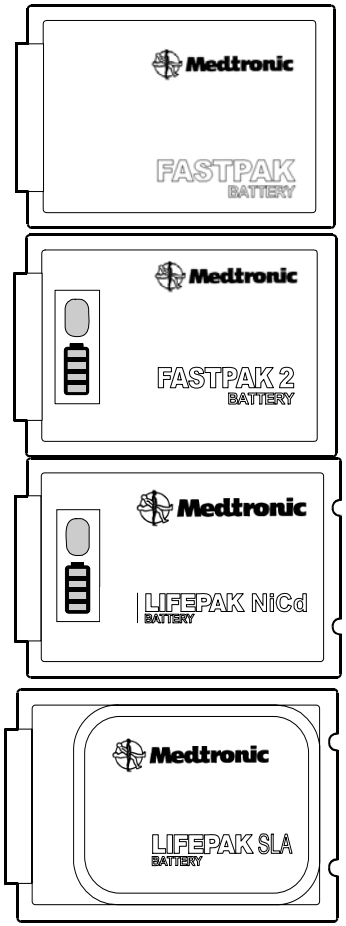
Possible loss of power during patient care. **Do not connect more than one DC output extension cable between the external power adapter and the LIFEPAK 12 defibrillator/monitor. The resultant voltage drop may prevent the power adapter from charging the batteries or operating the LIFEPAK 12 defibrillator/monitor. Always connect the power adapter directly to the defibrillator or use only one extension cable.**

Shock hazard. **Using a power line cord other than the one supplied with the ac power adapter could cause excess leakage currents. Use only the ac power adapter power cord (MIN 803650).**

Refer to the LIFEPAK 12 Defibrillator/Monitor **Operating Instructions – AC and DC Power Adapters** for details about charging batteries installed in the LIFEPAK 12 defibrillator/monitor. Each of these batteries may be charged in the LIFEPAK 12 defibrillator/monitor when it is powered by an external power adapter. However, all conditioning and shelf-life test must be performed in the Battery Support System (FASTPAK), Battery Support System 2 or Mobile Battery Service Station (FASTPAK, FASTPAK 2, LIFEPAK NiCd, and LIFEPAK SLA).

Conditioning Batteries

Overview



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Conditioning is a series of charge/deep discharge cycles performed in the Battery Support System 2 or Mobile Battery Service Station to measure and optimize battery capacity. Condition FASTPAK, FASTPAK 2, LIFEPAK NiCd, and LIFEPAK SLA batteries in the Battery Support System 2 or Mobile Battery Service Station.

Note: The LIFEPAK 12 defibrillator/monitor with external power adapter cannot condition batteries.

Note: While it is permissible to condition the FASTPAK battery in the original Battery Support System, it is beyond the scope of this manual to describe that process.

Note: If a power failure occurs during battery conditioning, the Battery Support System 2 or Mobile Battery Service Station interrupts conditioning and reverts to charge mode after power is restored. Battery conditioning may not have been completed. Repeat the conditioning process.

The recommended frequency for conditioning of FASTPAK, FASTPAK 2 and LIFEPAK NiCd batteries is every 3 months. LIFEPAK SLA batteries may be conditioned as desired, although routine conditioning is not required.

For detailed instructions on battery conditioning, select from the following:

- **FASTPAK Battery Conditioning**
- **FASTPAK 2 Battery Conditioning**
- **LIFEPAK NiCd Battery Conditioning**
- **LIFEPAK SLA Battery Conditioning**

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Conditioning Batteries *(continued)*

FASTPAK Battery Conditioning

The approximate time to condition a FASTPAK battery in the Battery Support System 2 is 7 hours (2 hours in the Mobile Battery Service Station). Maintain an ambient temperature for the Battery Support System 2 or Mobile Battery Service Station between 20°C and 25.5°C (68°F and 78°F) during conditioning.

To condition a FASTPAK battery in the Battery Support System 2:

1. Place the battery in any battery well.
2. Press the CONDITION control.
3. The READY indicator illuminates after conditioning is complete.

To condition a FASTPAK battery in the Mobile Battery Service Station:

1. Place the battery in any battery well.
2. Remove the battery from the battery well when the CHARGING indicator illuminates. The display will change to CONDITINING for about 3 seconds.
3. Re-insert the battery again while CONDITIONING is displayed.
4. The READY indicator illuminates after conditioning is complete.

   Note: If the DISCARD indicator illuminates, remove the battery from use and **discard/recycle**.

Remove the FASTPAK battery from the Battery Support System 2 or Mobile Battery Service Station and record the conditioning date on the back of the battery.

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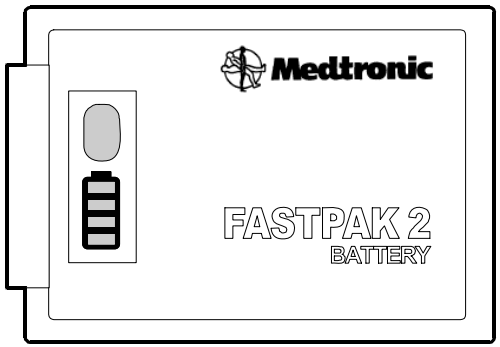
Conditioning Batteries *(continued)*

FASTPAK 2 Battery Conditioning



The approximate time to condition a FASTPAK 2 battery in the Battery Support System 2 is 7 hours (2 hours in the Mobile Battery Service Station). Maintain an ambient temperature for the Battery Support System 2 or Mobile Battery Service Station between 20°C and 25.5°C (68°F and 78°F) during conditioning.

To condition a FASTPAK 2 battery in the Battery Support System 2:

1. Place the battery in any battery well.
2. Press the CONDITION control.
3. The READY indicator illuminates after conditioning is complete.

To condition a FASTPAK 2 battery in the Mobile Battery Service Station:

1. Place the battery in any battery well.
2. Remove the battery from the battery well when the CHARGING indicator illuminates. The CONDITIONING indicator will illuminate for about 3 seconds.
3. Re-insert the battery again while the CONDITIONING indicator is illuminated.
4. The READY indicator illuminates after conditioning is complete.

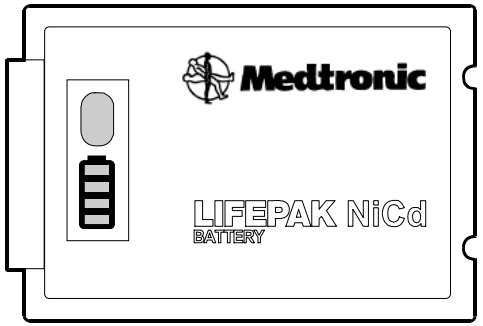
   Note: If the DISCARD indicator illuminates, remove the battery from use and **discard/recycle**.

Remove the charged battery when the READY indicator illuminates, or leave it in the battery charger to maintain the battery at peak capacity.

(Continued on next page)

Conditioning Batteries *(continued)*

LIFEPAK NiCd Battery Conditioning



The approximate time to condition a 1.7 amp/Hr LIFEPAK NiCd battery in the Battery Support System 2 is 10 hours (3 hours in Mobile Battery Service Station) and 11 hours to condition a 2.4 amp/Hr LIFEPAK NiCd battery (Mobile Battery Service Station is 4 hours). Maintain an ambient temperature for the Battery Support System 2 or Mobile Battery Service Station between 20°C and 25.5°C (68°F and 78°F) during conditioning.

To condition a LIFEPAK NiCd battery in the Battery Support System 2:

1. Place the battery in any battery well.
2. Press the CONDITION control.
3. The READY indicator illuminates after conditioning is complete.

To condition a LIFEPAK NiCd battery in the Mobile Battery Service Station:

1. Place the battery in any battery well.
2. Remove the battery from the battery well when the CHARGING indicator illuminates. The CONDITIONING indicator will illuminate for about 3 seconds.
3. Re-insert the battery again while the CONDITIONING indicator is illuminated.
4. The READY indicator illuminates after conditioning is complete.

   Note: If the DISCARD indicator illuminates, remove the battery from use and **discard/recycle**.

Remove the charged battery when the READY indicator illuminates, or leave it in the battery charger to maintain the battery at peak capacity.

(Continued on next page)

Conditioning Batteries *(continued)*

LIFEPAK SLA Battery Conditioning

LIFEPAK SLA Batteries do not require periodic conditioning as NiCd batteries do. For LIFEPAK SLA Batteries, the condition mode may be used to test battery performance or to determine whether a battery is viable.

The approximate time to condition a SLA battery in the Battery Support System 2 is 28 hours, 56 hours maximum (7 hours in Mobile Battery Service Station). Maintain an ambient temperature for the Battery Support System 2 or Mobile Battery Service Station between 20°C and 25.5°C (68°F and 78°F) during conditioning.

To condition a LIFEPAK SLA battery in the Battery Support System 2:

1. Place the battery in any battery well.
2. Press the CONDITION control.

To condition a LIFEPAK SLA battery in the Mobile Battery Service Station:

1. Place the battery in any battery well.
2. Remove the battery from the battery well when the CHARGING indicator illuminates. The The CONDITIONING indicator will illuminate for about 3 seconds.
3. Re-insert the battery again while the CONDITIONING indicator is illuminated.

Note: If the DISCARD indicator illuminates, remove the battery from use and **discard/recycle**.

The READY indicator illuminates after conditioning is complete.

Remove the charged battery when the READY indicator illuminates, or leave it in the battery charger to maintain the battery at peak capacity.

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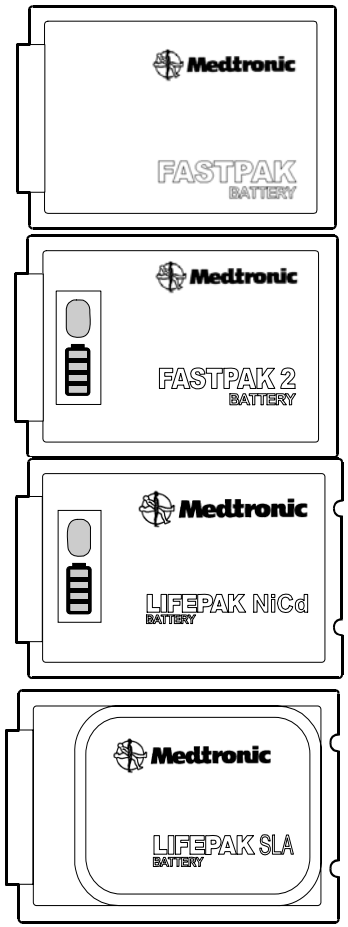
Testing Battery Shelf-Life

Overview



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Battery Support System 2 – The battery shelf-life test evaluates the discharge rate of a stored battery and rejects any battery that displays an excessive rate of discharge.

Typically, at temperatures between 20° C and 25.5° C (68° F and 78° F):

- A stored FASTPAK, FASTPAK 2, or LIFEPAK NiCd battery will discharge at approximately 1% of capacity every day.
- A stored LIFEPAK SLA battery will discharge at approximately 0.1% of capacity every day.

The recommended frequency for testing battery shelf life is every six months.

Note: shelf-life test is optional for LIFEPAK SLA batteries.

Note: While it is permissible to test the shelf life of the FASTPAK battery in the original Battery Support System, it is beyond the scope of this manual to describe that process.

For detailed instructions on shelf-life test, select from the following:

- **FASTPAK Battery Shelf-Life Test**
- **FASTPAK 2 Battery Shelf-Life Test**
- **LIFEPAK NiCd Battery Shelf-Life Test**
- **LIFEPAK SLA Battery Shelf-Life Test**

(Continued on next page)

Testing Battery Shelf-life *(continued)*

FASTPAK Battery Shelf-Life Test

Allow approximately 8 days for shelf-life test a FASTPAK battery in a Battery Support System 2. Maintain an ambient temperature for the Battery Support System 2 between 20°C and 25.5°C (68°F and 78°F).

To shelf-life test a FASTPAK battery in the Battery Support System 2:

1. Complete **FASTPAK Battery Conditioning** for the battery. Remove the battery from the Battery Support System 2 and store for 7 days.

2. After 7 days have elapsed, place the battery in any battery well, and then press the SHELF LIFE control within 3 seconds. Verify the SHELF LIFE indicator illuminates.

3. Remove the charged battery when the READY indicator illuminates, or leave it in the Battery Support System 2 to maintain the battery at peak capacity.

   Note: If the DISCARD indicator illuminates, the battery has failed shelf-life test. Remove the battery and **discard/recycle**.

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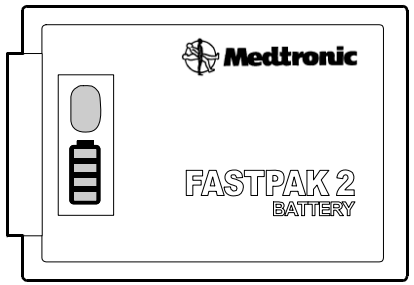
Testing Battery Shelf-life *(continued)*

FASTPAK 2 Battery Shelf-Life Test



Allow approximately 8 days for shelf-life test a FASTPAK 2 battery in a Battery Support System 2. Maintain an ambient temperature for the Battery Support System 2 between 20°C and 25.5°C (68°F and 78°F).

To shelf-life test a FASTPAK 2 battery in the Battery Support System 2:

1. Complete **FASTPAK 2 Battery Conditioning** for the battery. Remove the battery from the Battery Support System 2 and store for 7 days.

2. After 7 days have elapsed, place the battery in any battery well, and then press the SHELF LIFE control within 3 seconds. Verify the SHELF LIFE indicator illuminates.

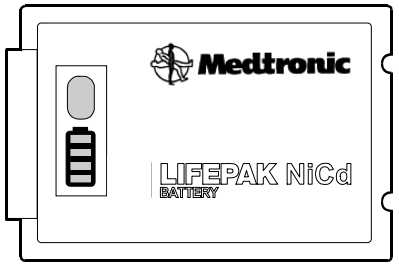
3. Remove the charged battery when the READY indicator illuminates, or leave it in the Battery Support System 2 to maintain the battery at peak capacity.

   Note: If the DISCARD indicator illuminates, the battery has failed shelf-life test. Remove the battery and **discard/recycle**.

(Continued on next page)

Testing Battery Shelf-life *(continued)*

LIFEPAK NiCd Battery Shelf-Life Test



Allow approximately 8 days for shelf-life test a 1.7 or a 2.4 amp/Hr LIFEPAK NiCd battery in a Battery Support System 2. Maintain an ambient temperature for the Battery Support System 2 between 20°C and 25.5°C (68°F and 78°F).

To shelf-life test a LIFEPAK NiCd battery in the Battery Support System 2:

1. Complete **LIFEPAK NiCd Battery Conditioning** for the battery. Remove the battery from the Battery Support System 2 and store for 7 days.

2. After 7 days have elapsed, place the battery in any battery well, and then press the SHELF LIFE control within 3 seconds. Verify the SHELF LIFE indicator illuminates.

3. Remove the charged battery when the READY indicator illuminates, or leave it in the Battery Support System 2 to maintain the battery at peak capacity.

   Note: If the DISCARD indicator illuminates, the battery has failed shelf-life test. Remove the battery and **discard/recycle**.

(Continued on next page)

Testing Battery Shelf-life *(continued)*

LIFEPAK SLA Battery Shelf-Life Test

Allow approximately 8 days for shelf-life test a LIFEPAK SLA battery in a Battery Support System 2. Maintain an ambient temperature for the Battery Support System 2 between 20°C and 25.5°C (68°F and 78°F).

To shelf-life test a LIFEPAK SLA battery in the Battery Support System 2:

1. Complete **LIFEPAK SLA Battery Conditioning** for the battery. Remove the battery from the Battery Support System 2 and store for 7 days.

2. After 7 days have elapsed, place the battery in any battery well, and then press the SHELF LIFE control within 3 seconds. Verify the SHELF LIFE indicator illuminates.

3. Remove the charged battery when the READY indicator illuminates, or leave it in the Battery Support System 2 to maintain the battery at peak capacity.

Note: If the DISCARD indicator illuminates, the battery has failed shelf-life test. Remove the battery and **discard/recycle**.

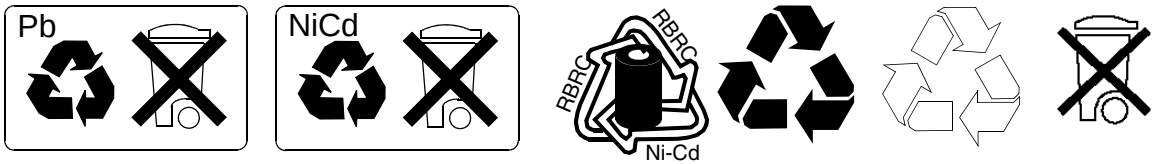
Discarding/Recycling Batteries

Properly maintained NiCd batteries have a useful life of approximately 2 years. Properly maintained sealed lead acid batteries have a useful life of up to 3 years. A LIFEPAK 12 defibrillator/monitor battery is at the end of its useful life if one or more of the following circumstances occur:

- There is physical damage to the battery case.
- The battery is leaking.
- The Battery Support Service2 indicates DISCARD during any maintenance procedure.

Recycle batteries locally according to national, regional, and local governmental regulations. If recycling is not possible, contact a Medtronic representative for information or assistance. In the U.S., call 1.800.442.1142.

To promote awareness of battery recycling, FASTPAK, FASTPAK 2, and LIFEPAK SLA batteries are marked with one of these symbols:



Storing Batteries

WARNING!

Possible loss of power during patient care. Stored batteries lose charge. Failure to charge a battery before use may cause device power failure without warning. Always charge a stored battery before placing it in use.

A battery is considered to be in storage when it is not in active use, is not in active rotation for use, or is not being actively maintained.

Store batteries in or out of the Battery Support System 2 or Mobile Battery Service Station except when performing the shelf-life test. During storage, batteries still require routine maintenance. Refer to **Conditioning Batteries** and **Testing Battery Shelf-Life**.

FASTPAK, FASTPAK 2, LIFEPAK NiCd, and LIFEPAK SLA batteries require special handling procedures for storage and then placing in use.

- Store batteries between 4.4°C and 26.7°C (40°F and 80°F). Lower temperatures reduce the battery discharge rate. Higher temperatures increase the discharge rate.
- Fully charge LIFEPAK SLA batteries before storing.
- Do not freeze batteries. Damage to the battery may result.
- Charge stored batteries before placing in use.

Receiving New Batteries

WARNING!

Possible loss of power during patient care. New batteries may not be fully charged. Failure to charge a battery before use may cause device power failure without warning. Always charge a new battery before placing it in use.

When you receive new batteries:

- Promptly label each new battery. Use a unique identification number to easily track the battery through all maintenance and rotation procedures.
- Charge each new battery prior to placing in use. Refer to **Charging Batteries**.

Replacement Procedures

The Replacement Procedures are a set of detailed instructions for disassembly, handling, and reassembly of replaceable LIFEPAK 12 defibrillator/monitor assemblies. Perform an interior inspection whenever the LIFEPAK 12 defibrillator/monitor case is opened for service. When disconnecting cables and wire harnesses, label the cables and connections so that they match easily during reassembly, for example, J01, J03, and so forth. Refer to the **Interconnect Diagram** for additional information.

While most activities start with the procedure **Disassembling Case**, you must be familiar with the contents of this section, which includes the following:

Summary of Replacement Procedures

Replacement procedures are referenced and linked in the **Inside Front Case** and **Inside Rear Case** drawings. To simplify cable referencing, only the cable number is used in the replacement procedures. For example, the W01 Power PCB/System PCB Cable is referenced in procedures as the W01 Cable.

Choose from the following replacement procedures:

(Continued on next page)

Summary of Replacement Procedures *(continued)*

(Continued on next page)

Summary of Replacement Procedures *(continued)*

Warnings and Cautions

The following general warnings and cautions apply to all actions you may perform during maintenance of the LIFEPAK 12 defibrillator/monitor.

WARNINGS!

Shock hazard. Servicing of this device must be performed by properly trained individuals. This device may retain potentially lethal charges accessible inside the device at any time–even when off. Follow the procedures carefully for discharging the Energy Storage Capacitor and Pacing Storage Capacitor.

Shock hazard. The Energy Storage Capacitor and Pacing Storage Capacitor carry high voltage. Discharge the capacitors before handling.

Possible shock and device damage. It is possible to pinch and damage wires during reassembly. To avoid pinching wires, carefully follow reassembly instructions.

CAUTION!

Possible component damage. The PCB assemblies contain static-sensitive devices (SSDs). To avoid damage, observe the special handling practices described in the section titled Static-Sensitive Device Handling.

Static-Sensitive Device Handling

About SSD Handling

Many electronic semiconductor devices (such as MOS ICs, FETs, optical isolators, or film resistors) can be damaged by the discharge of static electricity. Static charge buildup is very common. Static discharges commonly occur when the operator wears synthetic clothes and transfers the charge to any object touched. These discharges can damage or destroy static-sensitive devices (SSDs). In most cases, the discharge is not even perceptible to the person who causes it.

To prevent static discharge damage to SSDs, observe the following precautions during any open-case test, maintenance, or repair procedures:

Look for SSD Symbol

SSDs are identified with the following warning symbol:

Use Static-Dissipative Mat

Always perform repair or maintenance on a static-dissipative mat that is connected to earth ground.

(Continued on next page)

Static-Sensitive Device Handling *(continued)*

Wear a Wrist Strap

Always wear a conductive wrist strap connected to the mat and to ground except when working on energized equipment or when discharging high voltage circuits. The strap must be snug enough to make good contact against bare skin.

WARNING!

Shock hazard. Remove the wrist strap when working on energized equipment or when discharging high voltage circuits.

Transport and Store PCBs Properly

Transport and store PCBs in antistatic racks or inside conductive bags. Label the package that contains the PCBs as static-sensitive.

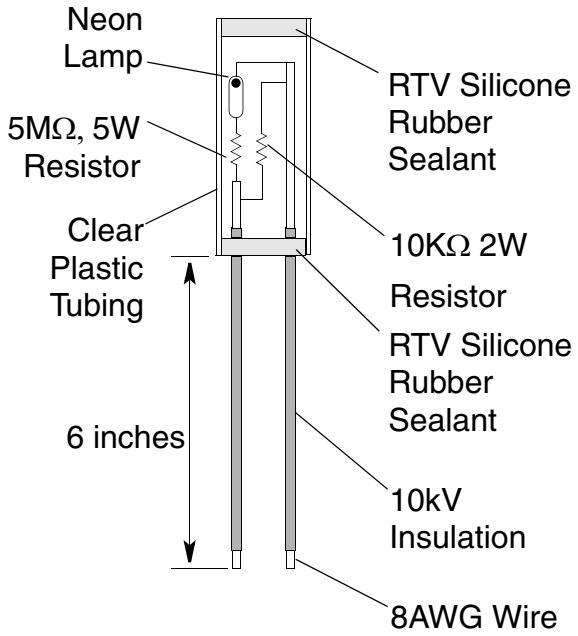
Keep Work Area Static-Free

Keep static-generating products such as styrofoam cups or trays away from the work area. Connect all electrical equipment such as soldering irons and test equipment to ground with a three-prong plug.

Test Work Area Routinely

Test all the antistatic parts of the work area (mat, straps, cables) routinely. Keep a log of the test results.

Building a Capacitor Discharge Tool (T01)



WARNING!

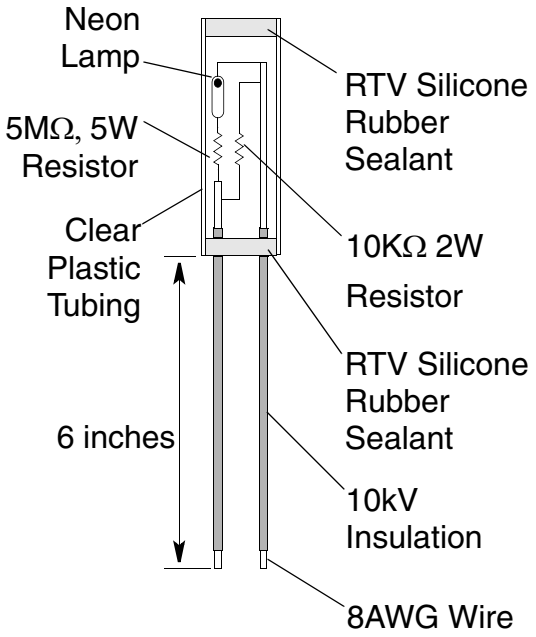
Shock hazard. Discharge tools that were not designed and labeled for Biphasic use are inadequate for use on Biphasic defibrillators. They will take several minutes to discharge the energy capacitor. Use only capacitor discharge tool MIN 3012102 on Biphasic defibrillators.

A Capacitor Discharge Tool is constructed and used to discharge the A15 Energy Storage Capacitor and the A04 Therapy PCB-C15 pacing capacitor. The following materials are required:

- 10kΩ, 2W resistor (ten 1KΩ 2W), high-voltage
- 5MΩ, 5W resistor, high-voltage
- Neon lamp, NE76, NE2, or NE2H
- 8AWG copper wire
- Clear plastic tubing, capable of insulating 10kV
- 10kV insulation
- RTV, silicone rubber sealant

Refer to **Using the Capacitor Discharge Tool** for information on using the tool for the **Discharging the Energy Storage Capacitor** and **Discharging the Pacing Capacitor** procedures.

Using the Capacitor Discharge Tool (T01)



WARNING!

Shock hazard. Discharge tools that were not designed and labeled for Biphasic use are inadequate for use on Biphasic defibrillators. They will take several minutes to discharge the energy capacitor. Use only capacitor discharge tool MIN 3012102 on Biphasic defibrillators.

The Capacitor Discharge Tool is used in the **Discharging the Energy Storage Capacitor** and **Discharging the Pacing Capacitor** procedures.

To use the Capacitor Discharge Tool:

1. Place one probe on a discharge point and hold it steady.
2. Place the other probe on the remaining discharge point and hold both probes steady.
3. Observe the neon lamp inside the Capacitor Discharge Tool. If a charge of approximately 90 volts is present, the neon lamp will light.

WARNING!

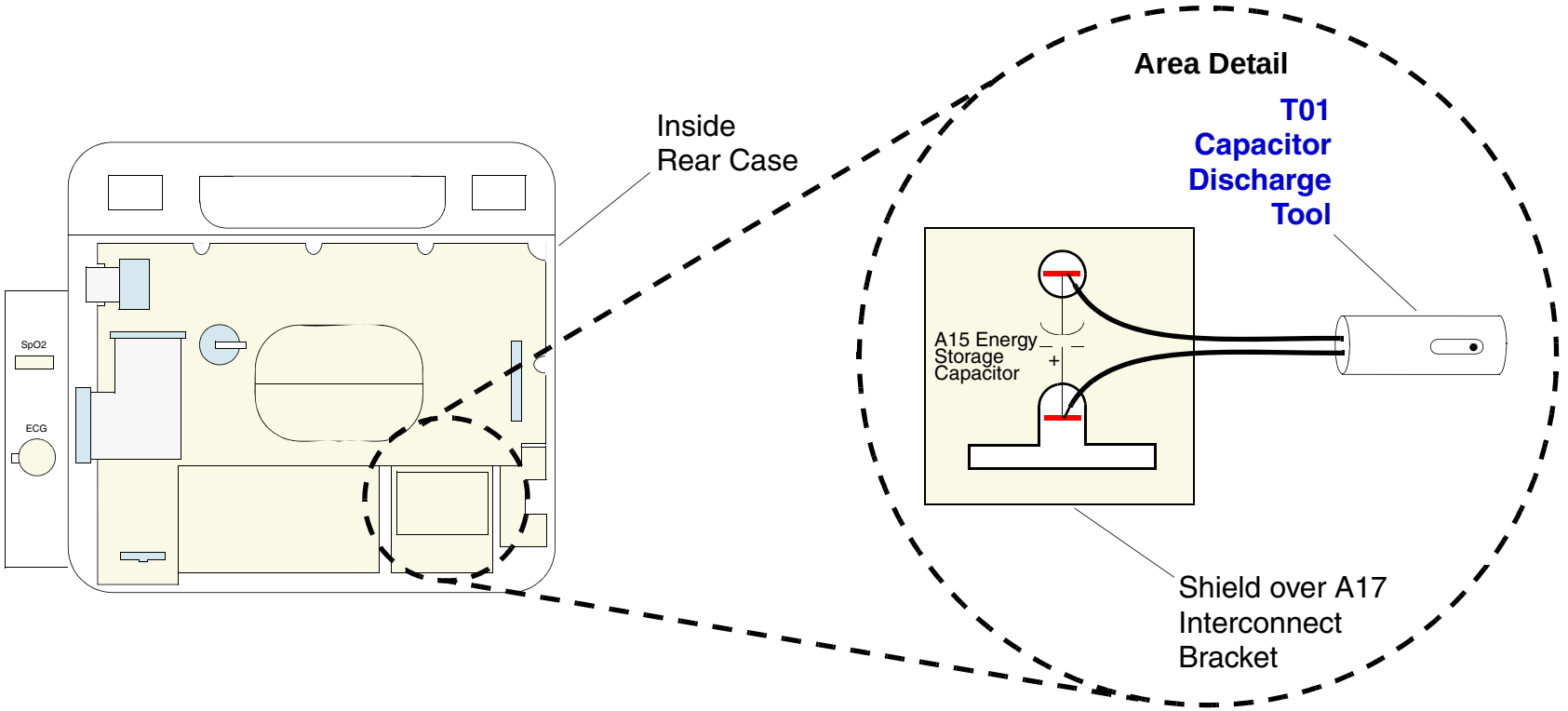
Shock hazard. Do not assume the capacitor is uncharged if the neon lamp does not light! There may still be a charge on the capacitor. Do not touch capacitor terminals until completing the discharge operation.

4. Continue holding the probes on the points indicated for at least 30 seconds after the neon lamp is no longer lit.

Discharging Energy Storage Capacitor

Location of Discharge Points

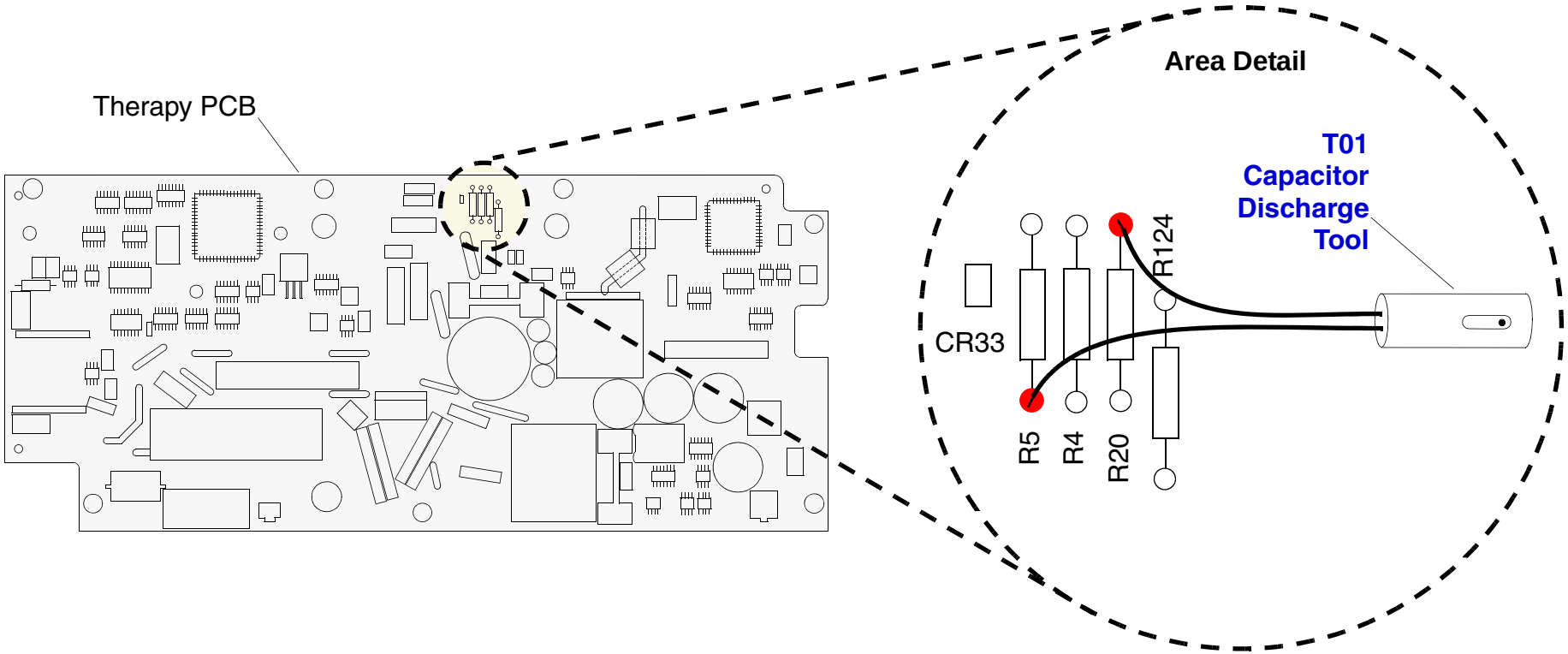
After case separation, immediately discharge the Energy Storage Capacitor (refer to **Using the Capacitor Discharge Tool**). The discharge points are located through holes on the A17 Interconnect Bracket (below) in the rear case.



Discharging Pacing Capacitor

Location of Discharge Points

After removing the **System/Memory/Therapy PCB device**, immediately discharge the pacing capacitor (refer to **Using the Capacitor Discharge Tool**). The discharge points are located at resistors R5 and R20 on the Therapy PCB (see below).



Saving Setup Configuration

The following procedures explain how to save the device setup configuration before beginning any repair action. The best method is to transfer the setup configuration to a spare device, complete repairs, and then transfer the setup configuration back again. To save the configuration in this manner, use the **Transfer and Save Setup Procedure**. The second method is to print the setup configuration, complete repairs, and then manually reconfigure the device.

Note: Saving the configuration with the **Transfer and Save Setup Procedure** requires that the software in the device being used for storage of configuration information is of the same revision. Otherwise, potentially unexpected results may occur once the configuration has been restored to the repaired device.

Note: When using the **Transfer and Save Setup Procedure**, both devices should be the same energy configurations (either both monophasic or both biphasic). After restoring configuration, the configuration information for default energy levels must be verified and, if required, restored manually.

Transfer and Save Setup Procedure

To transfer and save the setup configuration into a spare device:

1. With the power off in both devices, connect a Configuration Transfer Cable (MIN 3011538) between the device System Connectors.

(Continued on next page)

Saving Setup Configuration *(continued)*

Transfer and Save Setup Procedure (continued)

2. At each device, hold down both the OPTIONS and EVENT controls and apply power. The SETUP overlay screen appears on both devices.
3. At the device to be repaired, select SEND CONFIG from the SETUP menu. The SEND CONFIG screen appears.
4. With SEND selected on the SEND CONFIG screen, press the Selector. The setup configuration transfers to the spare device.
5. Select PRINT DEFAULTS from the SETUP menu. The printer prints the device setup configuration. Save this backup printout for possible future reference.
6. Turn off both devices.

Save Setup Manually Procedure

To print the setup configuration manually:

1. Hold down both the OPTIONS and EVENT controls and apply power. The SETUP overlay screen appears.
2. Select PRINT DEFAULTS from the SETUP menu. The printer prints the device setup configuration. Save this printout for future reference.
3. Turn off the device.

Restoring Setup Configuration

The following procedures assume you completed **Saving the Setup Configuration** using a spare device with the same revision of software before starting repairs. If you saved the setup using the **Transfer and Save Setup Procedure**, continue the Restoring by Transfer Procedure. If you saved the setup manually, continue to the **Restoring Setup Manually Procedure**.

Restoring by Transfer Procedure

To restore the setup configuration by transfer:

1. Connect the spare device (with the desired setup configuration) and the repaired device with a Configuration Transfer Cable (MIN 3011538) between the device System Connectors.
2. At each device, hold down both the OPTIONS and EVENT controls and apply power. The SETUP overlay screen appears on both devices.
3. At the spare device, select SEND CONFIG from the SETUP menu. The SEND CONFIG screen appears.
4. Select SEND on the SEND CONFIG screen and press the Selector. The setup configuration transfers to the repaired device.
5. Turn off both devices.

(Continued on next page)

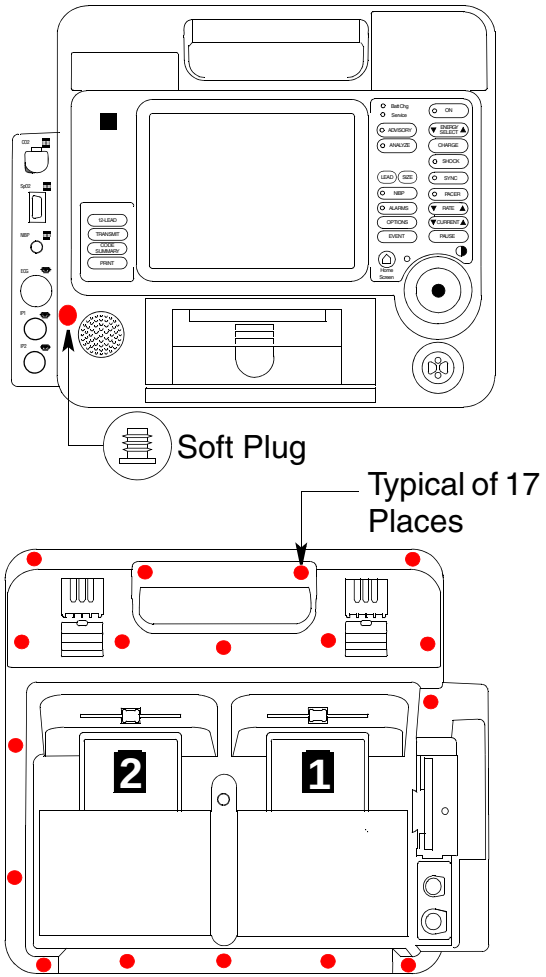
Restoring Setup Configuration *(continued)*

Restoring Setup Manually Procedure

To restore the setup configuration manually:

1. Hold down both the OPTIONS and EVENT controls and apply power. The SETUP overlay screen appears.
2. Using the printout from the **Saving the Setup Configuration** procedure, check the settings in each menu and revise as necessary to match the printout. The printout is organized in the same manner as the SETUP menu: GENERAL, MANUAL MODE, ADVISORY MODE, and so forth.
3. Turn off the device.

Disassembling Case



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To disassemble the case halves:

1. Remove all cables and patient connections, and remove the batteries.
2. Pry out the front case soft plug (**36**) and remove the hidden screw.
3. Lay the defibrillator on its face on a protective surface to prevent damage, and then remove the 17 screws around the perimeter (**232**).
4. Holding the case halves together, stand the device upright and then move the front case away from the rear case.
5. Compress the connector retaining clips to disconnect the W04 Cable at A01 System PCB-J2 in the rear case.
6. Move the front case away from the rear case as much as possible and then, before doing anything further, perform the **Discharging the Energy Storage Capacitor** procedure.

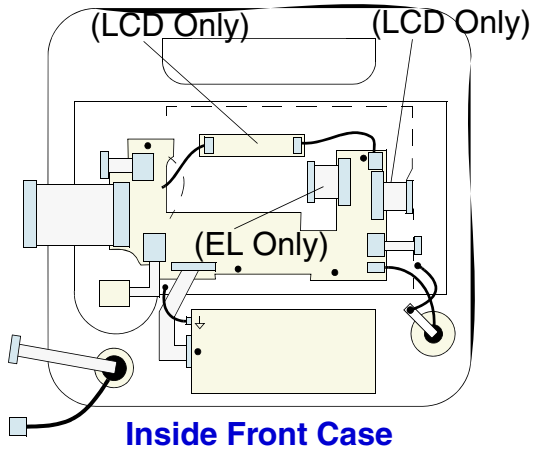
WARNING!

Shock hazard. Discharge tools that were not designed and labeled for Biphasic use are inadequate for use on Biphasic defibrillators. They will take several minutes to discharge the energy capacitor. Use only capacitor discharge tool MIN 3012102 on Biphasic defibrillators.

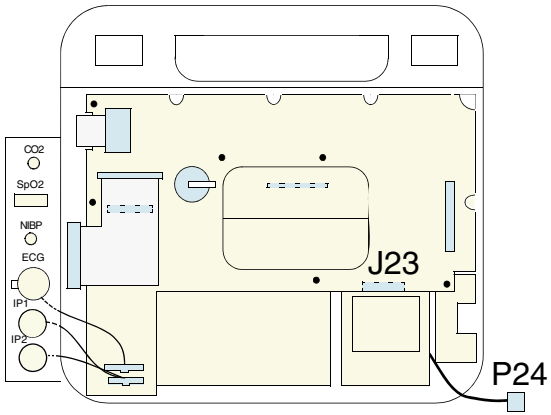
7. To continue, press the securing clip and disconnect W11 Therapy Connector-J24 from A13 Transfer Relay-P24 in the rear case.

(Continued on next page)

Disassembling Case *(continued)*



Inside Front Case



Inside Rear Case

8. Spread the securing clips and disconnect W11 Therapy Connector-P23 from Therapy PCB-J23 in the rear case.
9. Separate the front and rear cases halves.

Refer to the **Reassembling Case** procedure to reassemble the case halves.

To continue, select from the **Summary of Replacement Procedures**.

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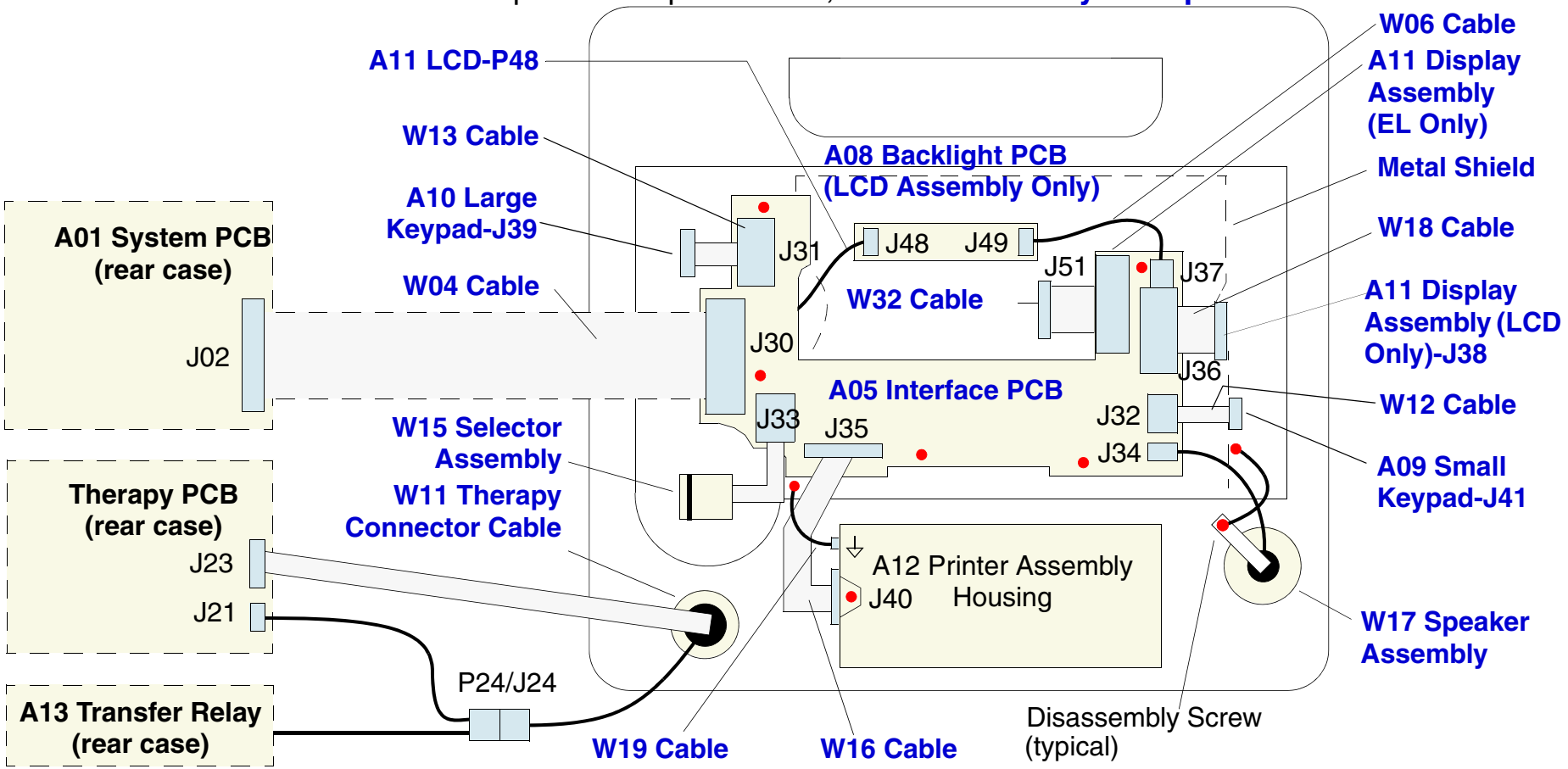
Inside Front Case

First View

Use this drawing after completing the **Disassembling Case** procedure. For a list of replacement procedures, refer to **Summary of Replacement Procedures**.



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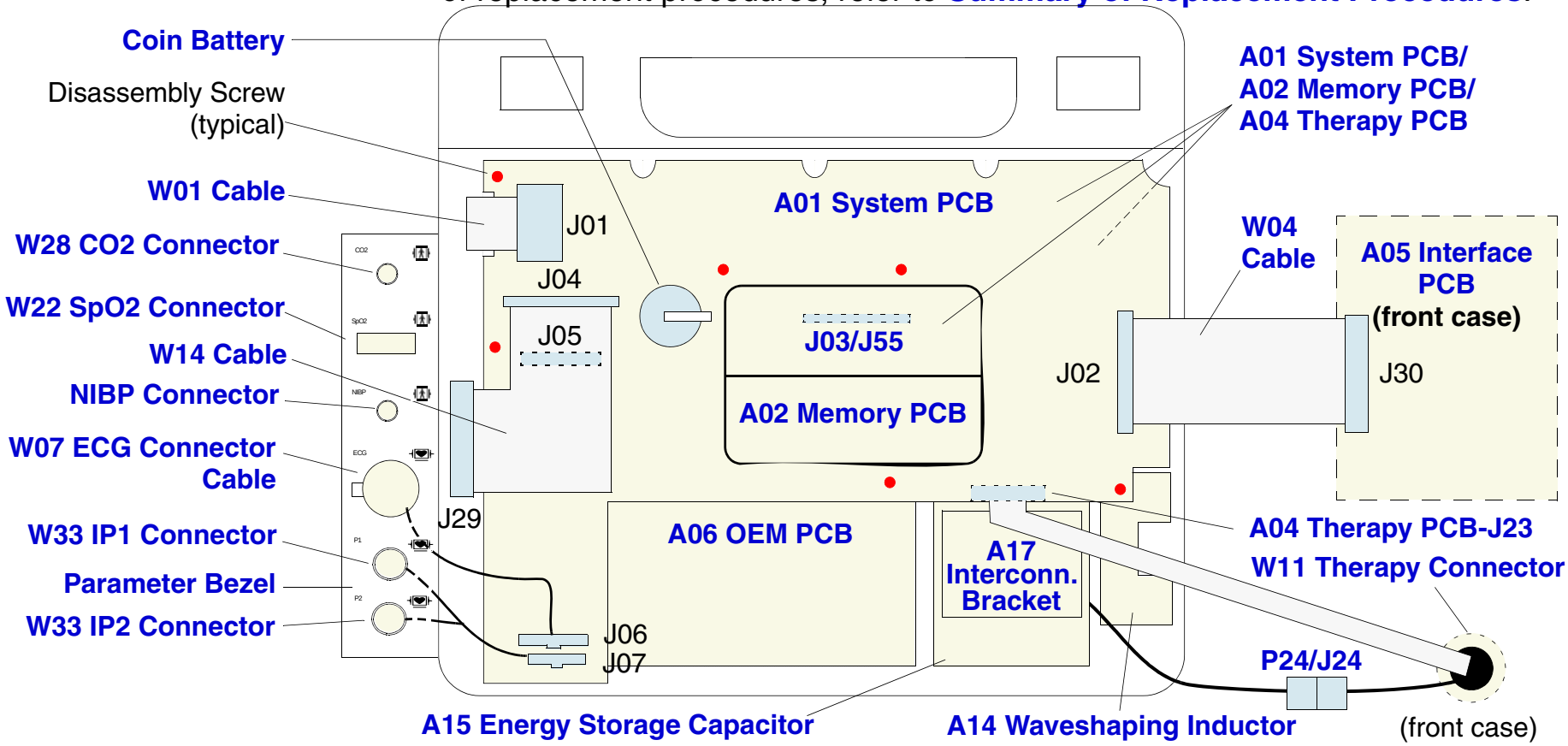
Inside Rear Case—Monophasic Devices

First View

Use this drawing after completing the **Disassembling Case** procedure. For a list of replacement procedures, refer to **Summary of Replacement Procedures**.



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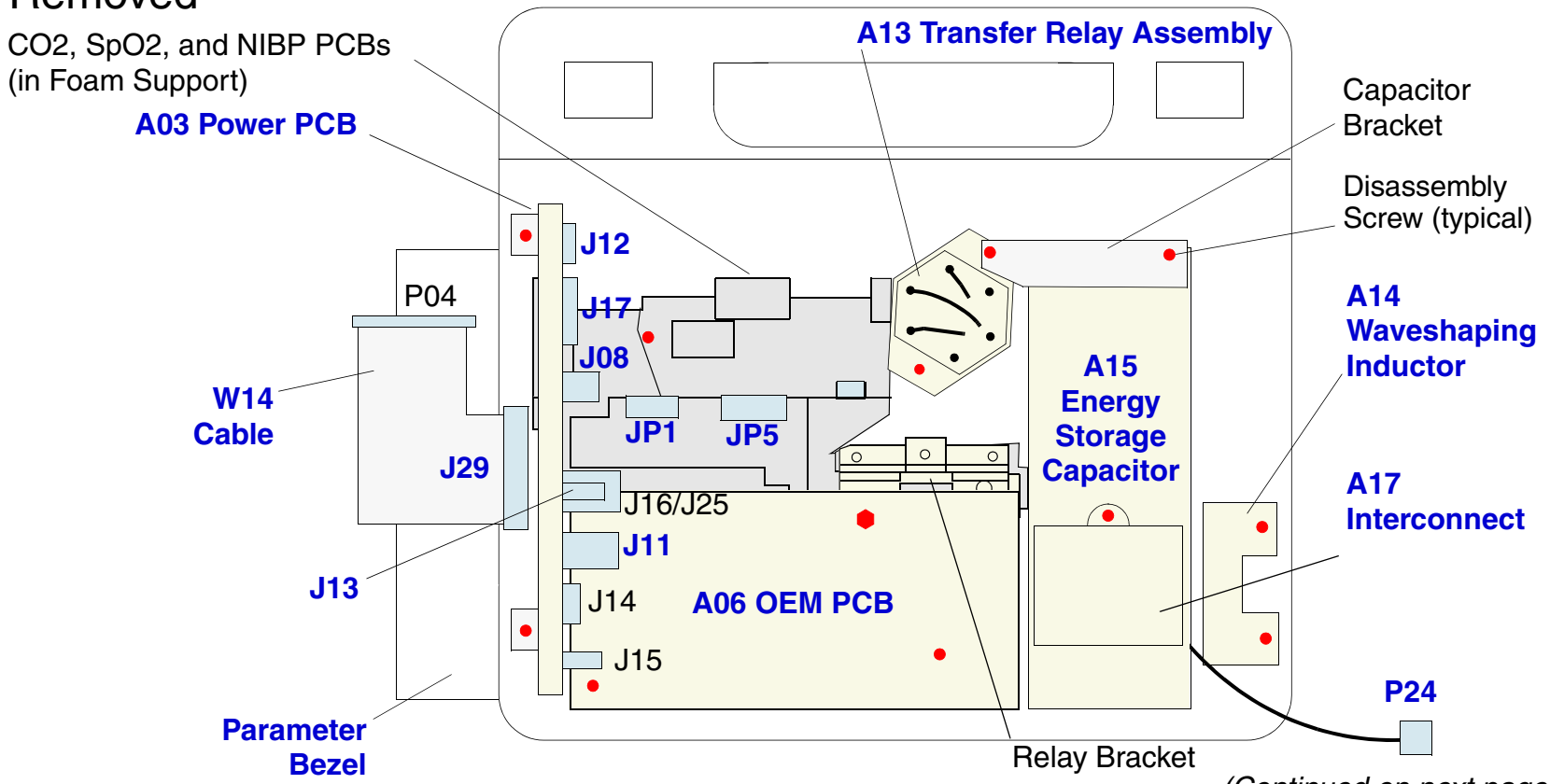
Inside Rear Case—Monophasic Devices *(continued)*

A01 System/A02 Memory/A04 Therapy PCB Device Removed

Use this drawing after completing the **A01 System/A02 Memory/A04 Therapy PCB Disassembly** procedure. For a list of replacement procedures, refer to **Summary of Replacement Procedures**.



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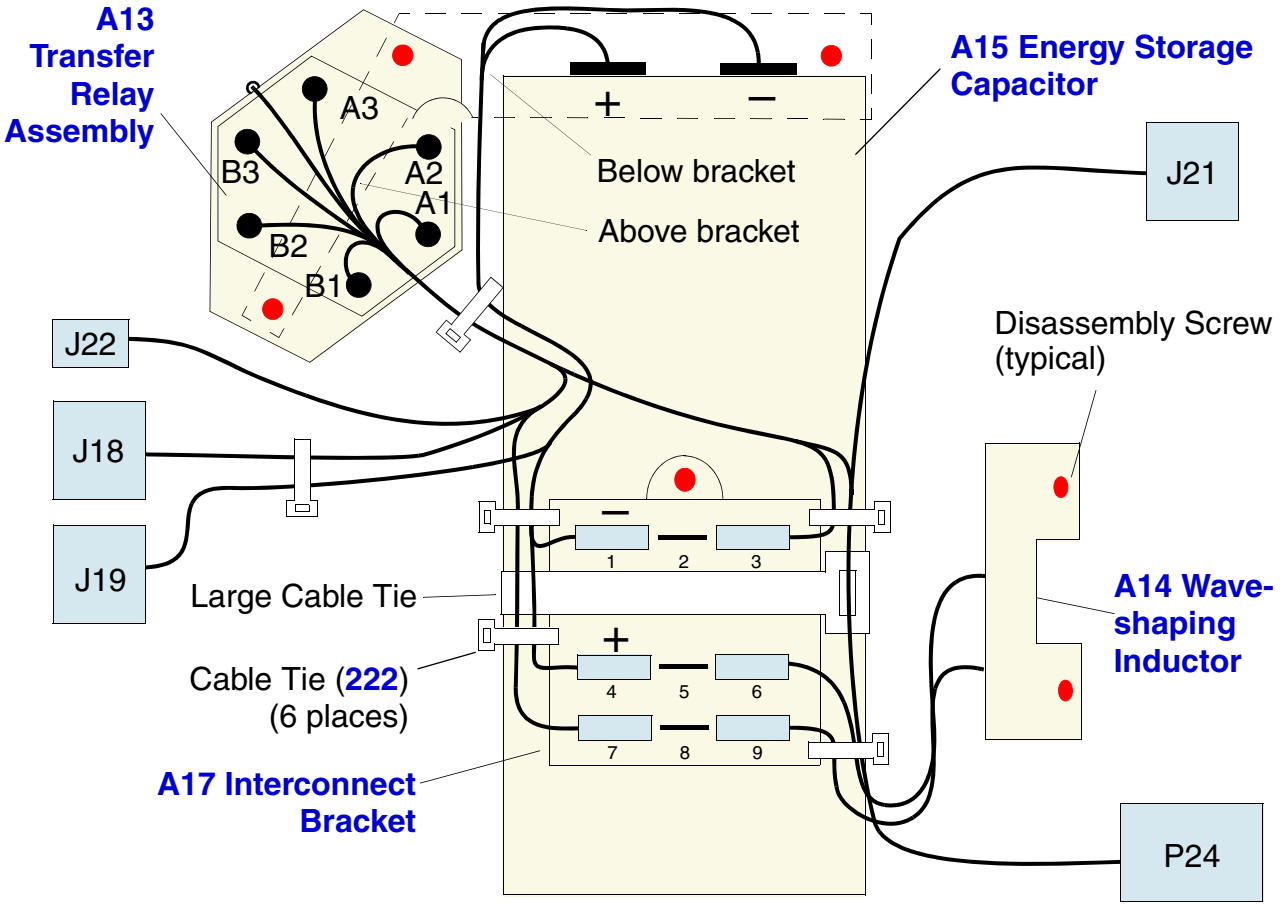
(Continued on next page)

Inside Rear Case—Monophasic Devices *(continued)*

Energy Transfer Detail Drawing

Use this drawing for replacing A13 Transfer Relay Assembly, A14 Waveshaping Inductor, A15 Energy Storage Capacitor, and A17 Interconnect Bracket.



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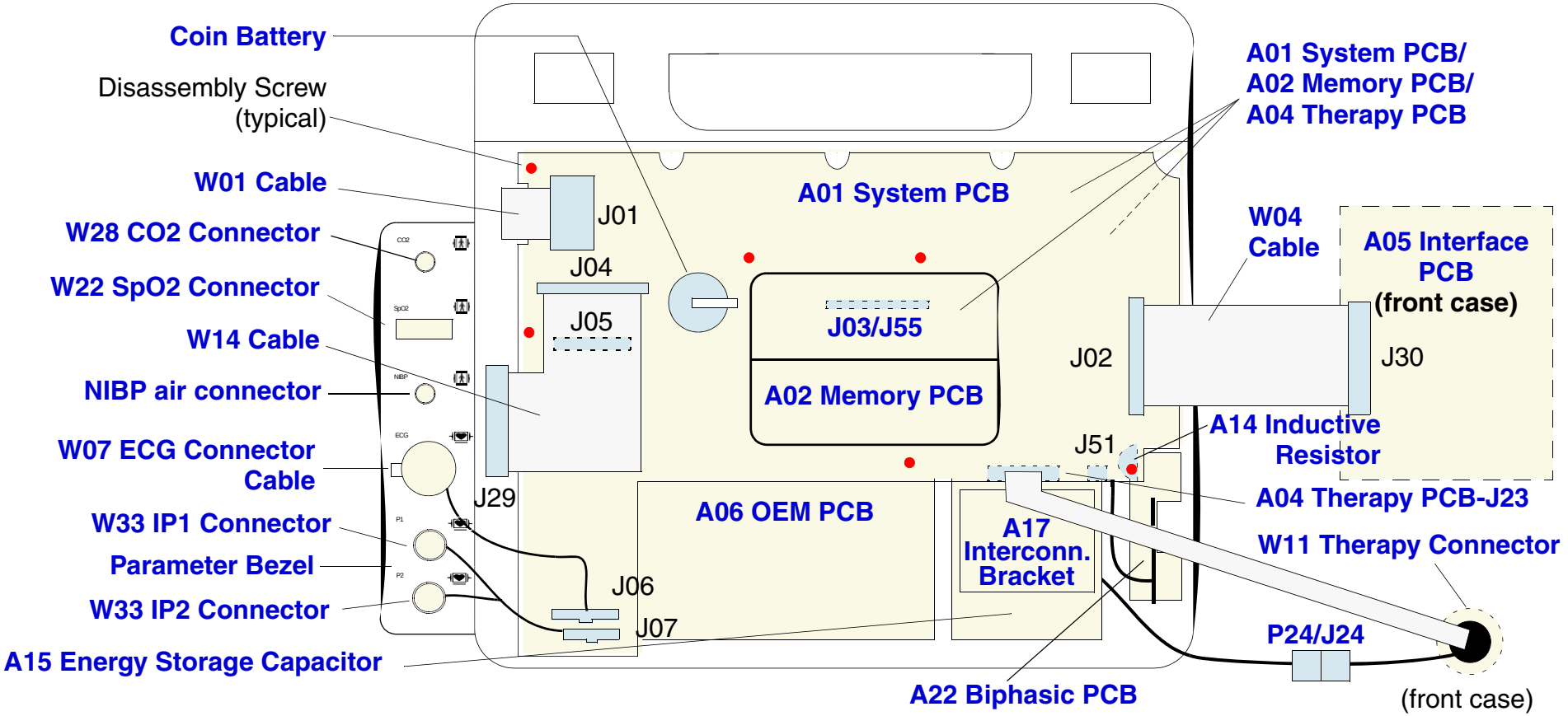
Inside Rear Case—Biphasic Devices

First View

Use this drawing after completing the **Disassembling Case** procedure. For a list of replacement procedures, refer to **Summary of Replacement Procedures**.



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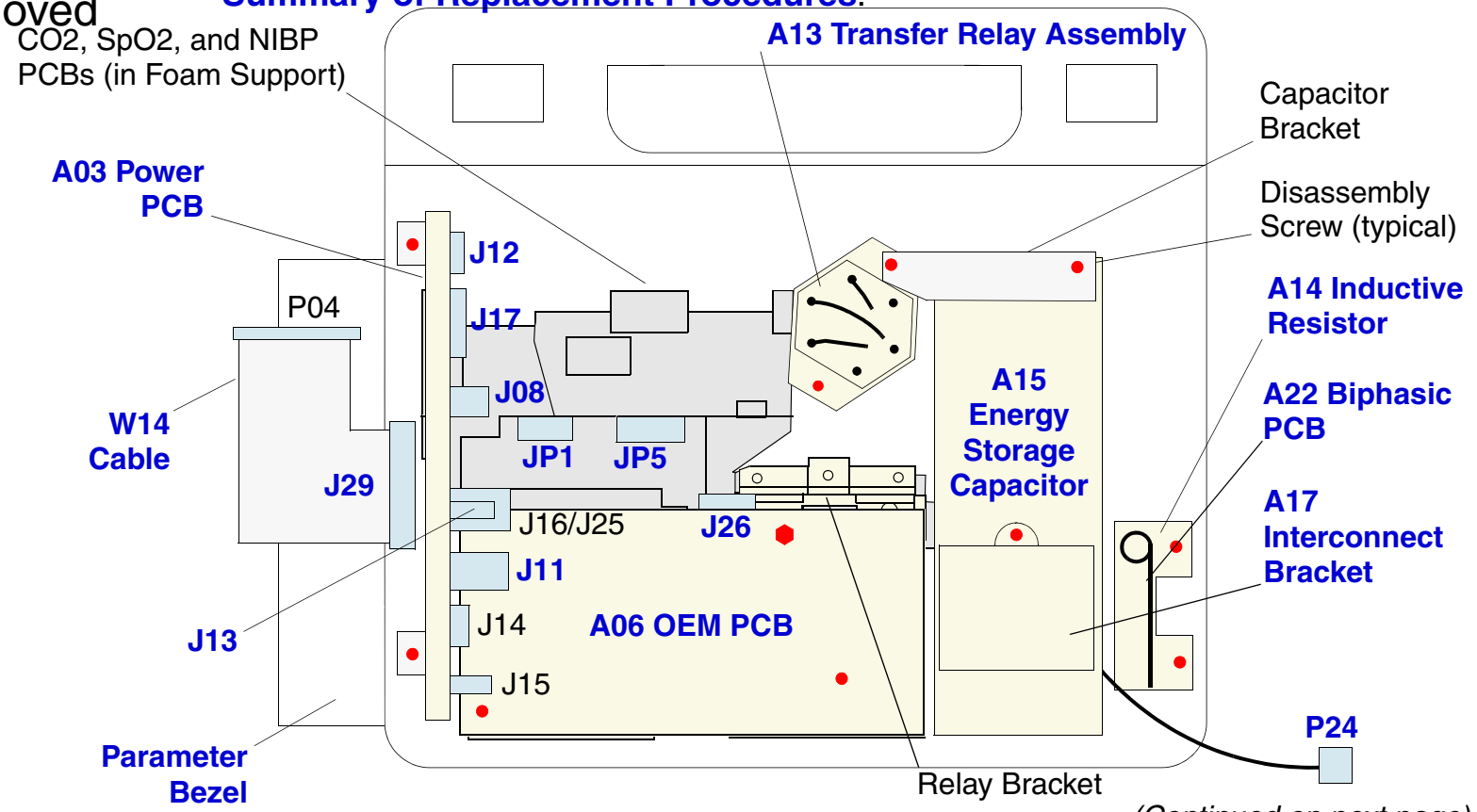
Inside Rear Case—Biphasic Devices *(continued)*

A01 System/A02 Memory/A04 Therapy PCB Device Removed

Use this drawing after completing the **A01 System/A02 Memory/A04 Therapy PCB Disassembly** procedure. For a list of replacement procedures, refer to **Summary of Replacement Procedures**.



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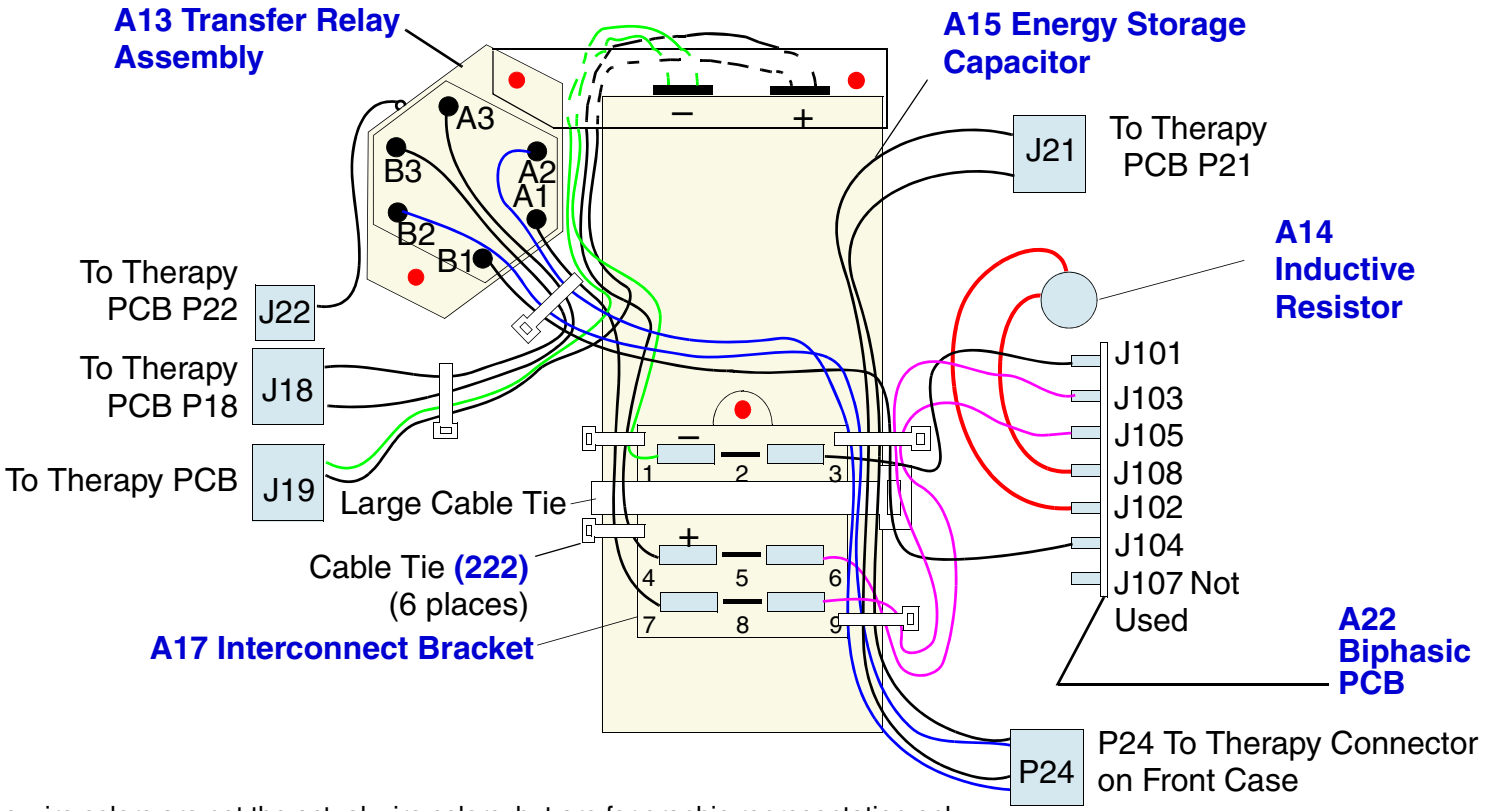
(Continued on next page)

Inside Rear Case—Biphasic Devices *(continued)*

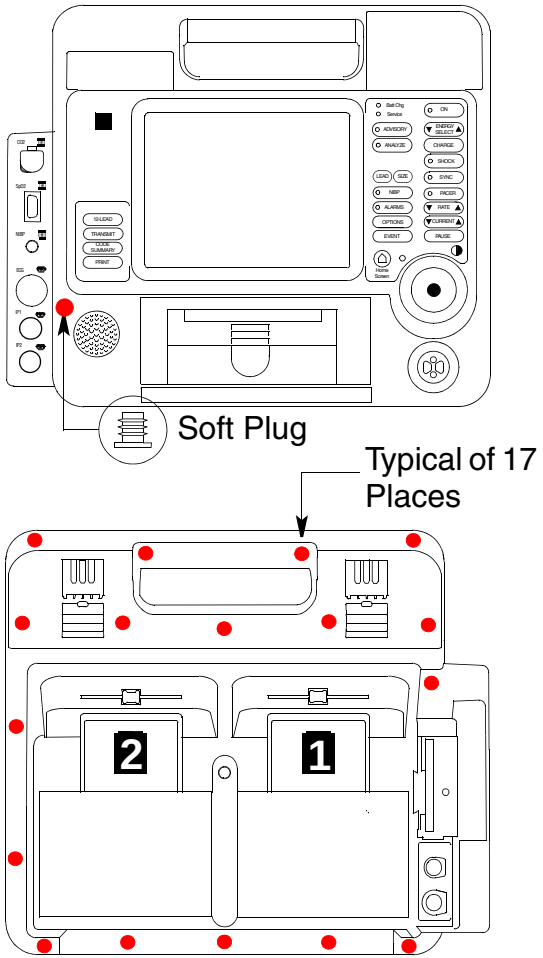
Energy Transfer Detail Drawing

Use this drawing for replacing the A13 Transfer Relay Assembly, A22 Biphasic PCB, A15 Energy Storage Capacitor, and A17 Interconnect Bracket.



The wire colors are not the actual wire colors, but are for graphic representation only.

Reassembling Case



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To reassemble the case halves:

1. Connect the W11 Therapy Connector Cable-P23 to A04 Therapy PCB-J23.
2. Connect the W11 Therapy Connector Cable-J24 to A13 Transfer Relay Assembly-P24.
3. Connect the W04 Cable between A01 System PCB-J02 and A05 Interface PCB-J30.
4. Fold the front and rear case halves together and install 17 new screws (**232**) around the perimeter.

CAUTION!

Possible moisture leakage. Visually inspect the mating surfaces between the front and the rear case halves before and after screwing them together to help ensure they are even.

Prevent vibration damage. In order to meet vibration specifications (for example, prevent loosening of case screws, internal assemblies, and so forth), use new screws when assembling the case (232).

(Continued on next page)

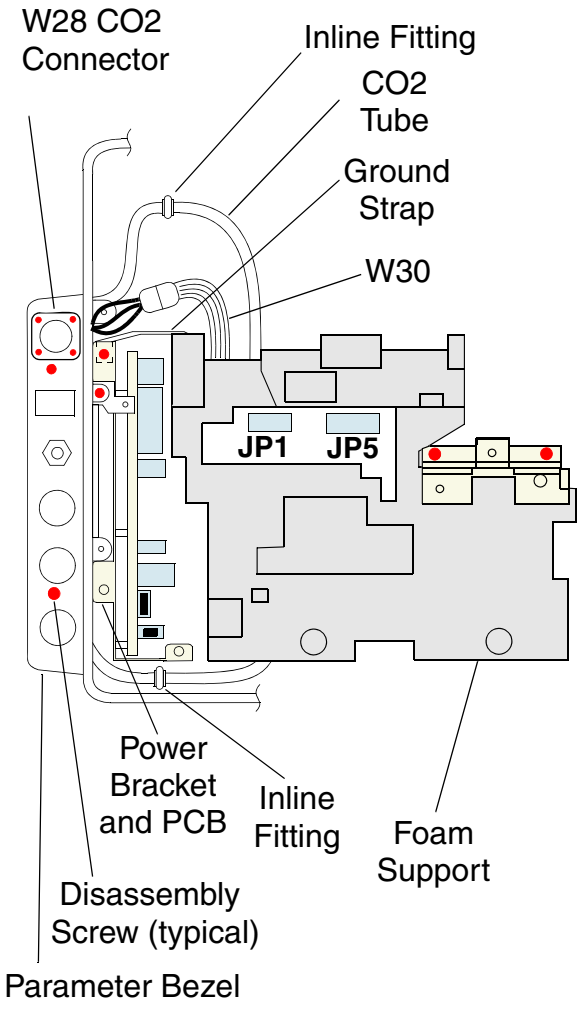
Reassembling Case *(continued)*

5. Install one new screw (**232**) at the front and reinstall the soft plug (**36**) covering the screw access hole.
6. Install the batteries.

   Note: Pay special attention to the SERVICE indicator as you turn on the device in the next step.

7. Turn on the device and observe the SERVICE indicator. If the SERVICE indicator is off, continue with step 8. If the SERVICE indicator is on, skip to step 9. If the device gives no indication that power is on, skip to step 10.
8. Complete the **Test and Calibration Procedure (TCP)**, followed by the **Performance Inspection Procedure (PIP)**.
9. Error codes have been written to the error log. Continue to **Processing Error Codes** in the **Troubleshooting** section.
10. When there is no indication of power, this means either that the batteries are dead, that no batteries are installed, or that the W04 Cable connection was not made when the case was reassembled. The W04 Cable is the ribbon cable between the front case and rear case. Check the batteries. If they are charged, conduct the procedure **Disassembling Case** and check the W04 Cable.

Parameter Bezel Removal, Nellcor



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To remove the Parameter Bezel:

Note: These steps include the A06 OEM PCB and all options on the Parameter Bezel. Your device may not have some of these options.

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning with step 2.
3. Complete the **A06 OEM PCB Replacement** procedure beginning with step 3. (Skip this step if NIBP, CO2, or SPO2 options are not installed.)
4. For orientation, locate components at **Inside Rear Case**.
5. Remove the retaining clip (**226**) and disconnect the W22 SpO2 Connector Cable from A16 SpO2 PCB at JP1. (Skip this step if the SPO2 option is not installed.)
6. Remove the two screws (**230**) securing the capacitor bracket (**60**). (Skip this step if NIBP, CO2, or SPO2 options are not installed.)
7. Remove the screw (230) and washer ((**336**) from A13 relay (relay-to-relay bracket). (Skip this step if NIBP, CO2, or SPO2 options are not installed.)
8. Move the relay out of the way. (Skip this step if NIBP, CO2, or SPO2 options are not installed.)

(Continued on next page)

Parameter Bezel Removal, Nellcor *(continued)*

9. Remove the two screws (**230**) securing the relay bracket (**46**) to the case and remove the bracket. (Skip this step if NIBP, CO2, or SPO2 options are not installed.)
10. Lift off the Upper Foam Support (**22**). (Skip this step if NIBP, CO2, or SPO2 options are not installed.)
11. Disconnect J17 on Cable W01, from A03 Power PCB, and set aside.
12. Disconnect J12 on Cable W05 from A03 Power PCB.
13. Disconnect the W28 CO2 connector cable end from adapter cable W30. (Skip this step if NIBP, CO2, or SPO2 options are not installed.)
14. Disconnect the W33 IP cable end from the J7 connector on the A01 System PCB. (Skip this step if NIBP, CO2, or SPO2 options are not installed.)
15. Remove the CO2 tube (coming from the bezel) from the routing clip, and then disconnect it from the jumper tube at the barbed inline fitting.

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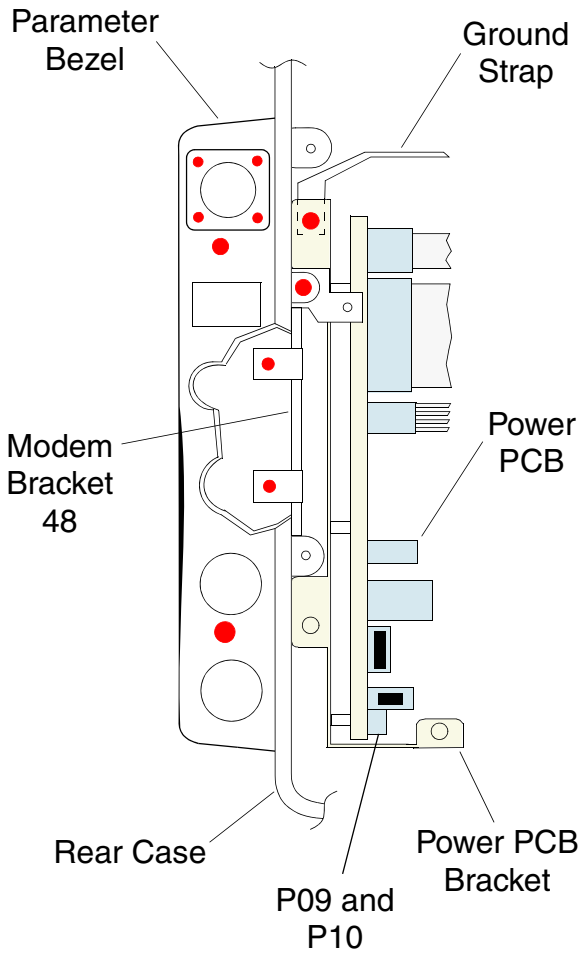
Parameter Bezel Removal, Nellcor *(continued)*



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16. Remove the CO2 tube (coming from the bezel) from the routing clip, and then disconnect it from jumper tube at the barbed inline fitting. (ECG cable connector W07 was disconnected during System/Memory/ Therapy PCB disassembly.)
17. Locate the W28 CO2 Connector Cover (**356**) on the bezel. Remove the cover. (Skip this step if NIBP, CO2, or SPO2 options are not installed.)
18. Lift one corner of the Parameter Bezel label (**158**) and peel it off.
19. Remove the two screws (**230**) securing the Parameter Bezel to the rear case. Remove the screw (**230**) securing it to the modem bracket (**48**).
20. Pull the parameter bezel up and out just enough to unscrew the two screws (**230**) attaching the modem bracket to the rear case.
21. Disconnect the NIBP PCB tube (**378**) at the back of the NIBP fitting on the parameter bezel.
22. Partially lift the parameter bezel, modem bracket, and power PCB bracket (**62**) with PCBs out together, and push W22 SPO2 Cable toward the parameter bezel to free the cable.
23. Lift out the parameter bezel from the rear case.

    Note: To remove cables from the Parameter Bezel, refer to the instructions for the specific cable number (for example, W07 ECG Connector Cable Replacement).

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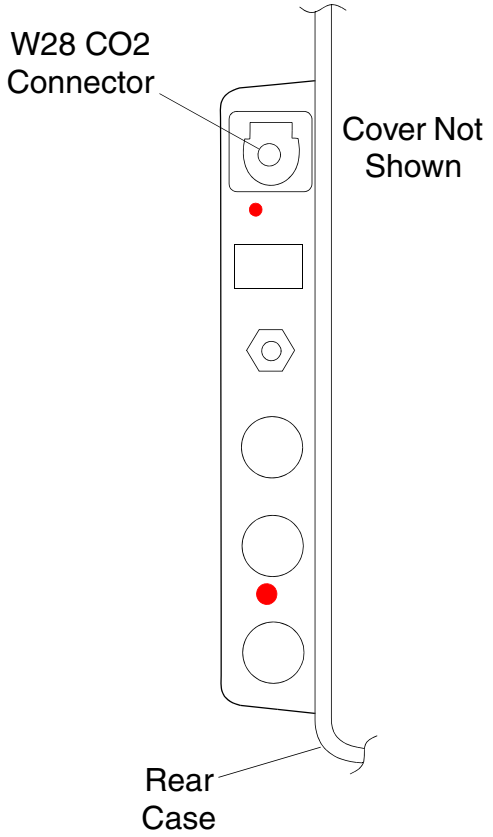
Parameter Bezel Removal, Nellcor *(continued)*



To assemble the Parameter Bezel, reverse the preceding steps and observe the following:

- Clean away any adhesive residue on the Parameter Bezel with isopropyl alcohol.

  Note: Devices without CO2: Place a Label Spacer (**386**) into the CO2 recess in the bezel before applying the label.

- Use a new Parameter Bezel label (**158**). Press the label down firmly. Devices with CO2: To press around the CO2 connector, use a smooth, narrow tool such as a tuning tool (plastic screwdriver) or the large end of a car key.

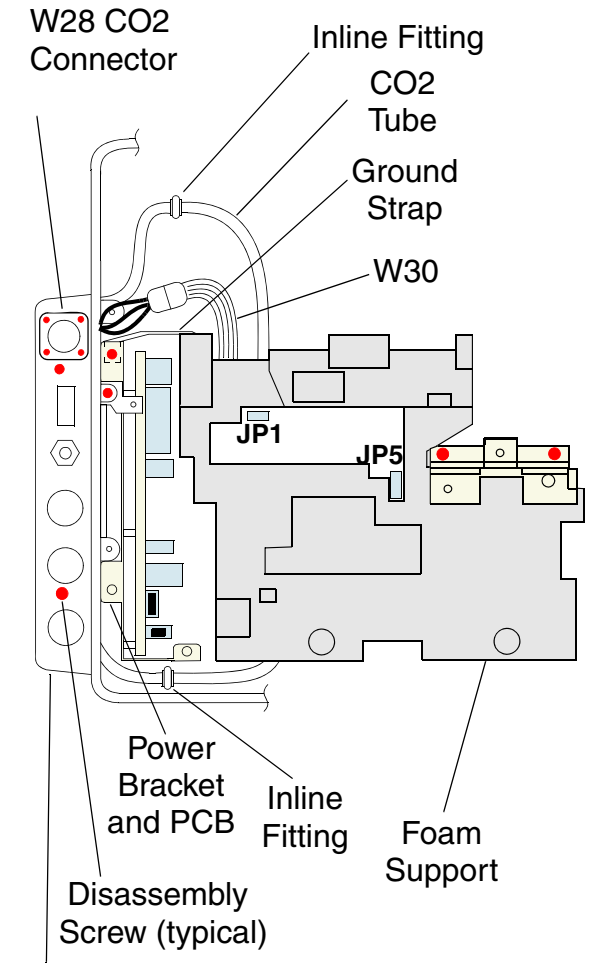
CAUTION!

Possible moisture leakage. Visually inspect the mating surfaces between the Parameter Bezel and the rear case before and after screwing it down to help ensure they are even.

Return to:

Parameter Bezel Replacement	**Rear Case—Biphasic or Monophasic Devices**
CO2 Connector Removal	**ECG Connector Cable**
System Connector Cable	**Auxiliary Connector Cable**

Parameter Bezel Removal, Masimo



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To remove the Parameter Bezel:

Note: These steps include the A06 OEM PCB and all options on the Parameter Bezel. Your device may not have some of these options.

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning with step 2.
3. Complete the **A06 OEM PCB Replacement** procedure beginning with step 3 (skip this step if NIBP, CO2, or SPO2 options are not installed).
4. For orientation, locate components at **Inside Rear Case**.
5. Remove A16 SpO2 PCB from the foam, and turn it over to disconnect the screw holding W22 to A16 JP1. Set the screw aside.
6. Disconnect the W22 SpO2 Connector Cable from A16 SpO2 PCB at JP1. (Skip this step if not installed.)
7. Remove the two screws (**230**) securing the capacitor bracket (**60**). (Skip this step if NIBP, CO2, or SPO2 options are not installed.)
8. Remove the screw (230) and washer (336) from the A13 relay (relay-to-relay bracket). (Skip this step if NIBP, CO2, or SPO2 options are not installed.)
9. Move the relay out of the way (skip this step if NIBP, CO2, or SPO2 options are not installed).

(Continued on next page)

Parameter Bezel Removal, Masimo *(continued)*

10. Remove the two screws (**230**) securing the relay bracket (**46**) to the case, and then remove the bracket. (Skip this step if NIBP, CO2, or SPO2 options are not installed.)
11. Lift off the Upper Foam Support (**22**). (Skip this step if NIBP, CO2, or SPO2 options are not installed.)
12. Disconnect J17 on Cable W01, from the A03 Power PCB and set aside.
13. Disconnect J12 on Cable W05 from the A03 Power PCB.
14. Disconnect the W28 CO2 connector cable end from adapter cable W30. (Skip this step if NIBP, CO2, or SPO2 options are not installed.)
15. Disconnect the W33 IP cable end from the J7 connector on the A01 System PCB. (Skip this step if NIBP, CO2, or SPO2 options are not installed.)
16. Remove the CO2 tube (coming from the bezel) from the routing clip, and then disconnect it from the jumper tube at the barbed inline fitting.

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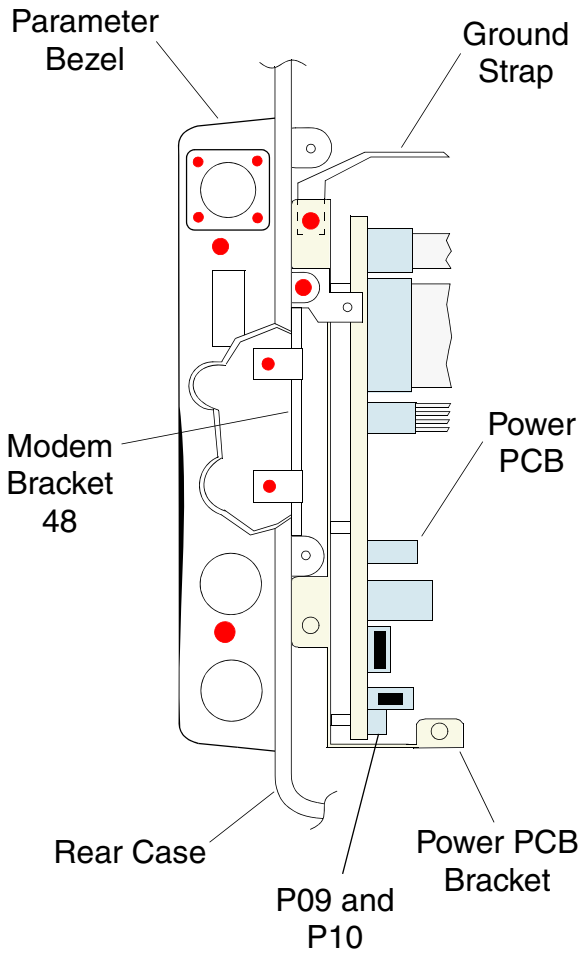
Parameter Bezel Removal, Masimo *(continued)*



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17. Remove the CO2 tube (coming from the bezel) from the routing clip, and then disconnect it from jumper tube at the barbed inline fitting. (ECG cable connector W07 was disconnected during System/Memory/ Therapy PCB disassembly.)
18. Locate the W28 CO2 Connector Cover (**356**) on the bezel. Remove the cover. (Skip this step if NIBP, CO2, or SPO2 options are not installed.)
19. Lift one corner of the Parameter Bezel label (**158**) and peel it off.
20. Remove the two screws (**230**) securing the Parameter Bezel to the rear case. Remove the screw (**230**) securing it to the modem bracket (**48**).
21. Pull the parameter bezel up and out just enough to unscrew the two screws (**230**) attaching the modem bracket to the rear case.
22. Disconnect the NIBP PCB tube (**378**) at the back of the NIBP fitting on the parameter bezel.
23. Partially lift the parameter bezel, modem bracket, and power PCB bracket (**62**) with PCBs out together, and push the W22 SPO2 Cable toward the parameter bezel to free the cable.
24. Lift out the parameter bezel from the rear case.

    Note: To remove cables from the Parameter Bezel, refer to the instructions for the specific cable number (for example, W07 ECG Connector Cable Replacement).

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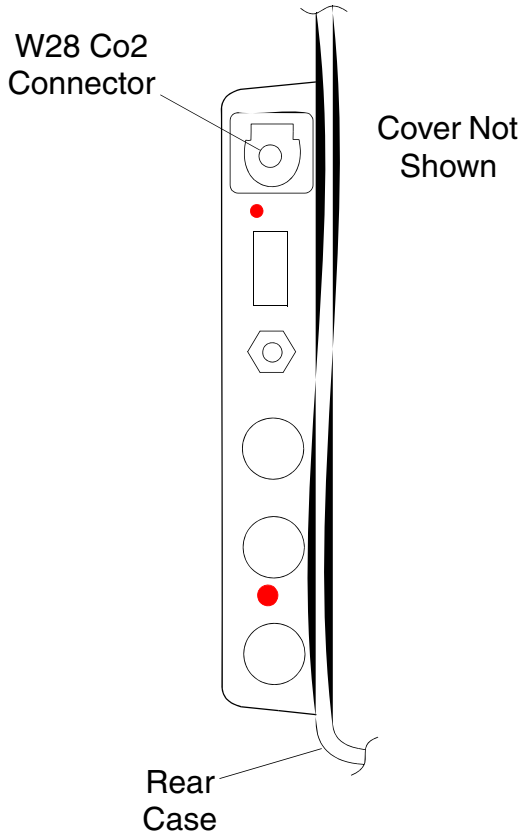
Parameter Bezel Removal, Masimo *(continued)*



To assemble the Parameter Bezel, reverse the preceding steps and observe the following:

- Clean away any adhesive residue on the Parameter Bezel with isopropyl alcohol.

  Note: Devices without CO2: Place a Label Spacer (**386**) into the CO2 recess in the bezel before applying the label.

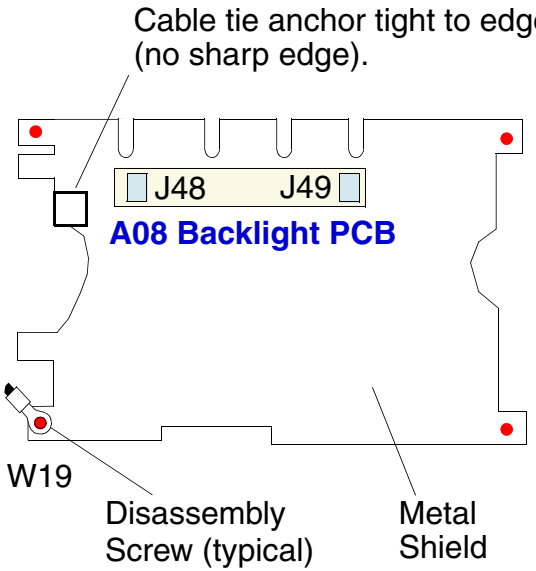
- Use a new Parameter Bezel label (**158**). Press the label down firmly. Devices with CO2: To press around the CO2 connector, use a smooth, narrow tool such as a tuning tool (plastic screwdriver) or the large end of a car key.

CAUTION!

Possible moisture leakage. Visually inspect the mating surfaces between the Parameter Bezel and the rear case before and after screwing it down to help ensure they are even.

To continue, select from the **Summary of Replacement Procedures**.

Disassembling Front Case Metal Shield—LCD Devices



To disassemble the front case metal shield (with A08 Backlight PCB intact):

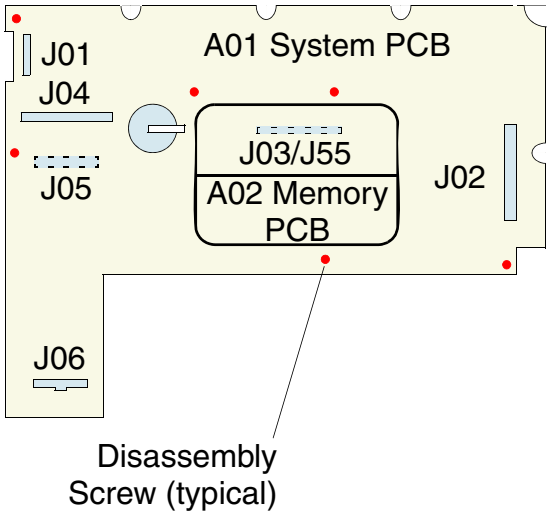
1. Complete the procedure **Disassembling Case**.
2. For orientation, locate the metal shield on the **Inside Front Case** drawing.
3. Remove the **A05 Interface PCB**.
4. If A08 requires replacement, remove the **A08 Backlight PCB** from the front case metal shield. Otherwise, continue with the next step.
5. Disconnect A11 LCD Assembly-P48 from A08 Backlight PCB-J48.
6. Remove the four screws (**230**) from the metal shield. Note the positioning of the eyelets for the W19 Cable (lower left corner). Lift the metal shield away from the front case.

To install the front case metal shield, reverse the preceding steps. Observe the following:

1. Verify connector A11 LCD Assembly-P48 is not pinched under the shield.
2. When replacing screws, correctly orient the eyelets for the W19 Cable and A11 LCD Cable.

For the next procedure, refer to **Summary of Replacement Procedures**, or return to **Front Case Replacement**

System/Memory/Therapy PCB Disassembly



WARNING!

Shock hazard. Handle all PCBs by their edges until the Pacing Capacitor C15 on the Therapy PCB is discharged in step 8.

To remove the A01 System/A02 Memory/A04 Therapy PCBs as a device:

1. Complete the **Disassembling Case** procedure.
2. For orientation, locate the A01 System PCB on the **Inside Rear Case** drawing.

   Note: For the next step, remove **only** the six screws shown in the drawing to the left.

3. Remove six screws (**230**).

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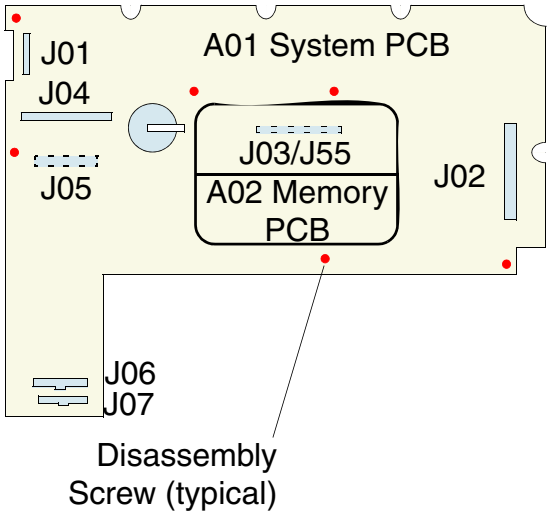
System/Memory/Therapy PCB Disassembly *(continued)*



4. Disconnect the connectors on the A01 System PCB:
   - J01 – Compress the connector retaining clips and disconnect the W01 Cable. The connector is blocked until the A01 System PCB is loosened.
   - J02 – Disconnect the W04 Cable as part of the Case Disassembling procedure.
   - J04 – Lift the connector and disconnect the W14 Cable.
   - J06 – Press the connector retaining clip (bottom of connector) and disconnect the W07 ECG Connector Cable.
   - J07 – Press the connector retaining clip (bottom of connector) and disconnect the W33 IP Connector Cable.
5. Set the rear case upright and move the System/Memory/Therapy PCB device towards the front of the case to gain access to the rear Therapy PCB connectors.

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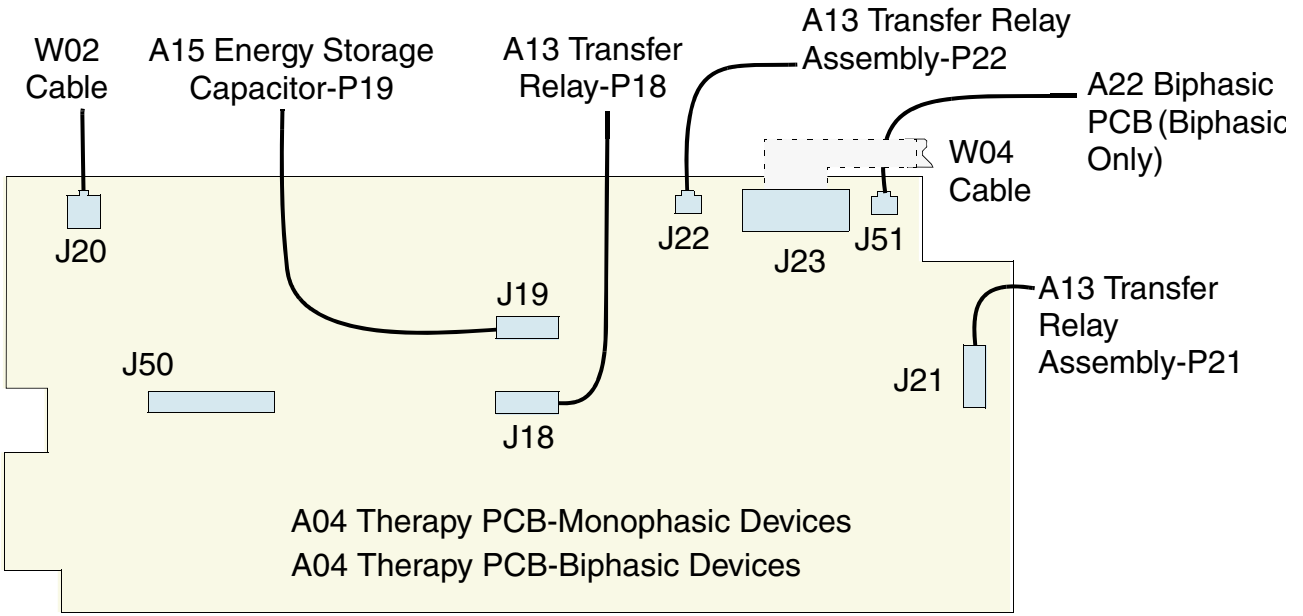
System/Memory/Therapy PCB Disassembly *(continued)*

6. Disconnect the six connectors on the Therapy PCB.



- J18 – Disconnect A13 Transfer Relay Assembly-P18.
- J19 – Disconnect A15 Energy Storage Capacitor-P19.
- J20 – Disconnect W02 Cable.
- J21 – Disconnect A13 Transfer Relay Assembly-P21.
- J22 – Disconnect A13 Transfer Relay Assembly-P22.
- J23 – (W04 Cable was disconnected during **Case Disassembly**).
- J51 – Disconnect A22 Biphasic PCB — Biphasic Devices only.

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System/Memory/Therapy PCB Disassembly *(continued)*

7. Lift the System/Memory/Therapy PCB device from the case and place on a flat surface with the Therapy PCB face up.
8. Immediately complete the **Discharging the Pacing Capacitor** procedure.
9. Note orientation of the option shield (**144**) (if installed) and remove from the rear case.

To install the System/Memory/Therapy PCB device, reverse the preceding steps.

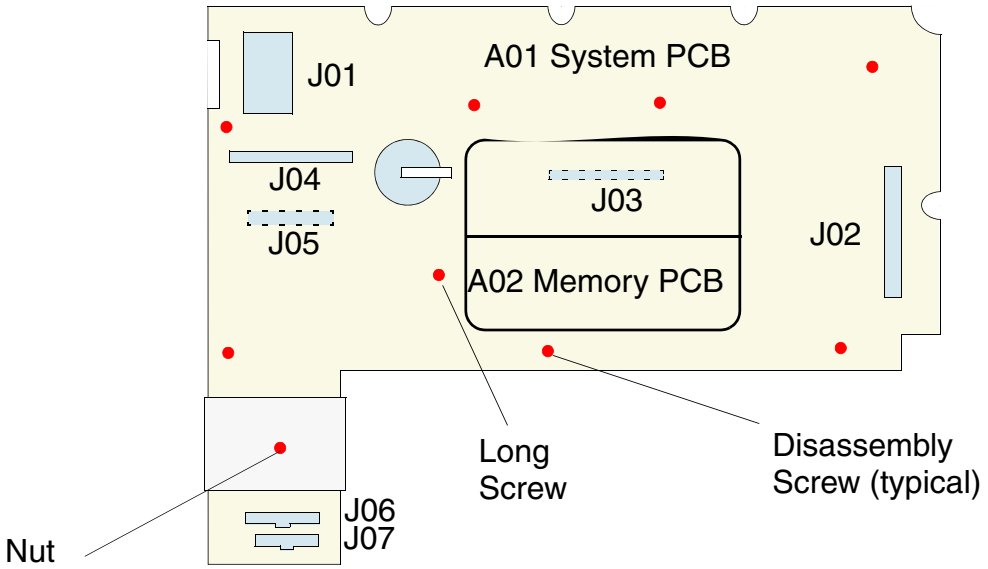
Note: Before attaching the six screws (**230**) that secure the System/Memory/Therapy PCB device in the rear case, connect the W01 Cable to A01 System PCB-J01.

For the next procedure, refer to **Summary of Replacement Procedures**.

A01 System PCB and A02 Memory PCB Replacement

To remove the A01 System PCB (rear case):

1. Complete the **Disassembling Case** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure.
3. Place the System/Memory/Therapy PCB device with A01 System PCB face up. Remove the seven screws (**230**) and one long screw (**296**) and nut (**216**). Make sure you loosen the screws and not the screw posts.



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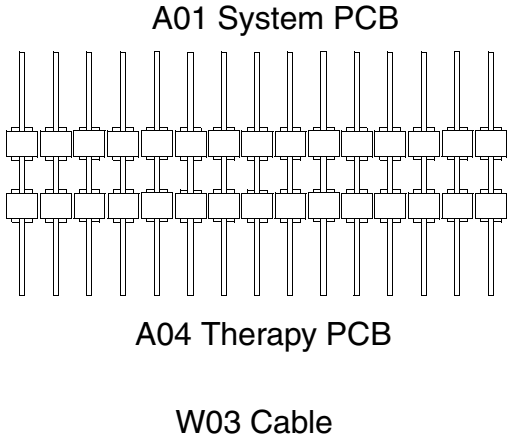
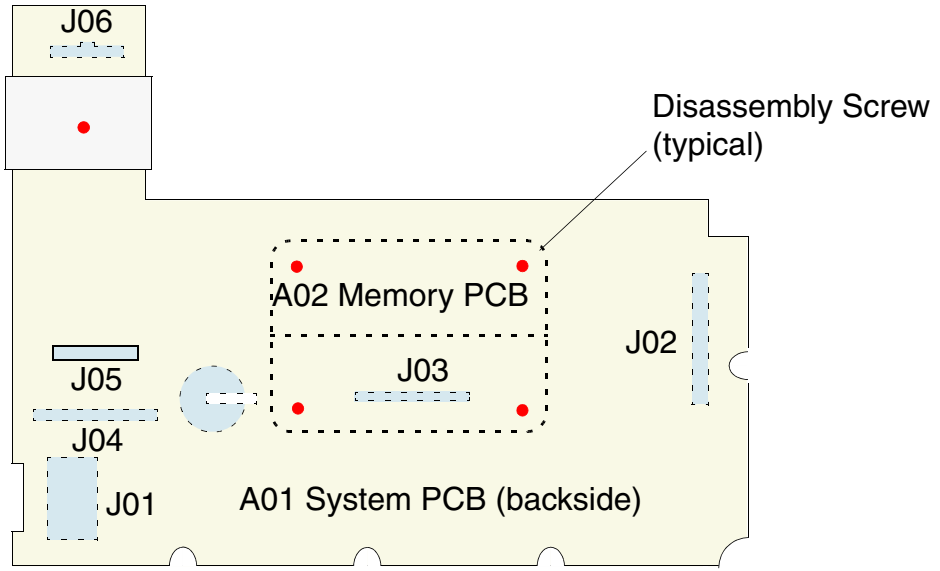
A01 System PCB and A02 Memory PCB Replacement

(continued)



4. Gently lift the A01 System PCB/A02 Memory PCB up and away from the Therapy PCB. The two PCBs are linked by the W03 Cable, which is a direct-connection contact assembly (see diagram on the left).
5. Remove the W03 Cable, and then place the Therapy PCB aside.
6. Turn the A01 System PCB over. On the back of the A01 System PCB, remove the four screws (**230**) securing the CPU EMI Shield (**12**). Note orientation for later reassembly, then remove the shield.



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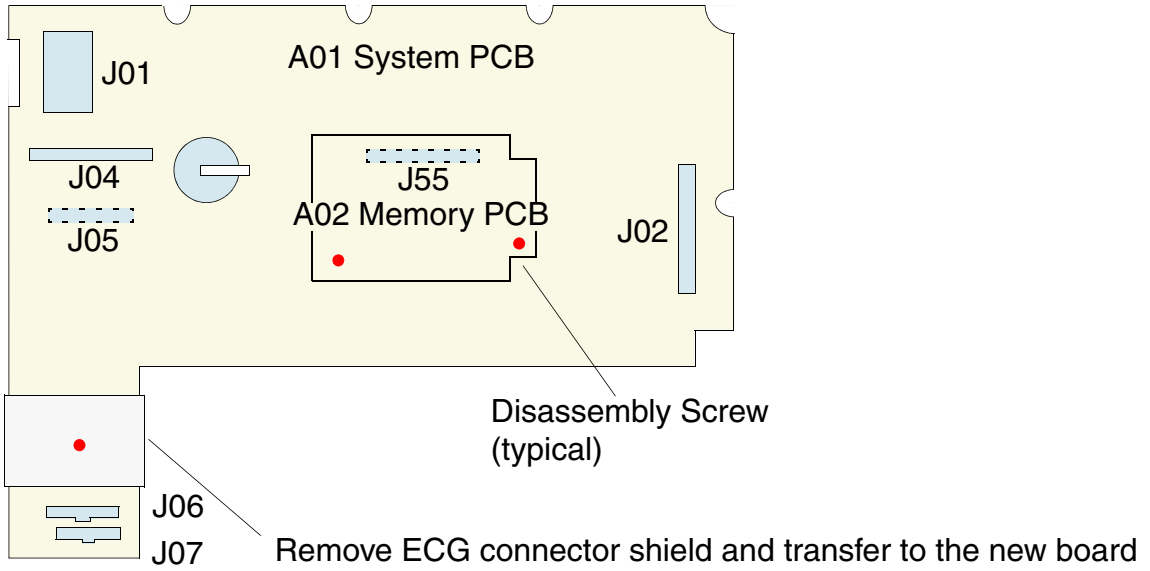
A01 System PCB and A02 Memory PCB Replacement

(continued)

7. Turn the A01 System PCB over. On the front of A01 System PCB, remove the two screws (**230**) securing the A02 Memory PCB.
8. Remove the A02 Memory PCB by lifting up and disconnecting the A02 Memory PCB-J55 from A01 System PCB-J03.



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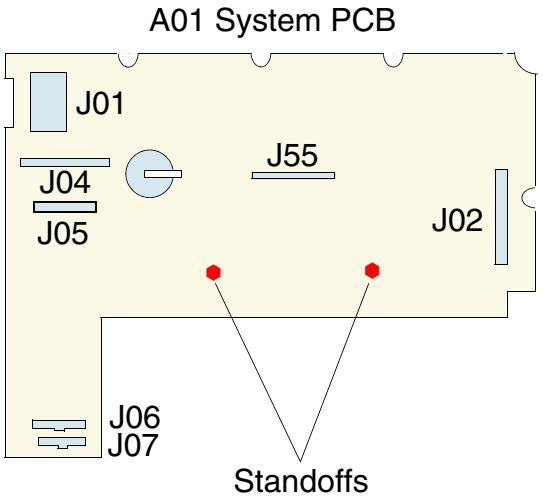
A01 System PCB and A02 Memory PCB Replacement

(continued)



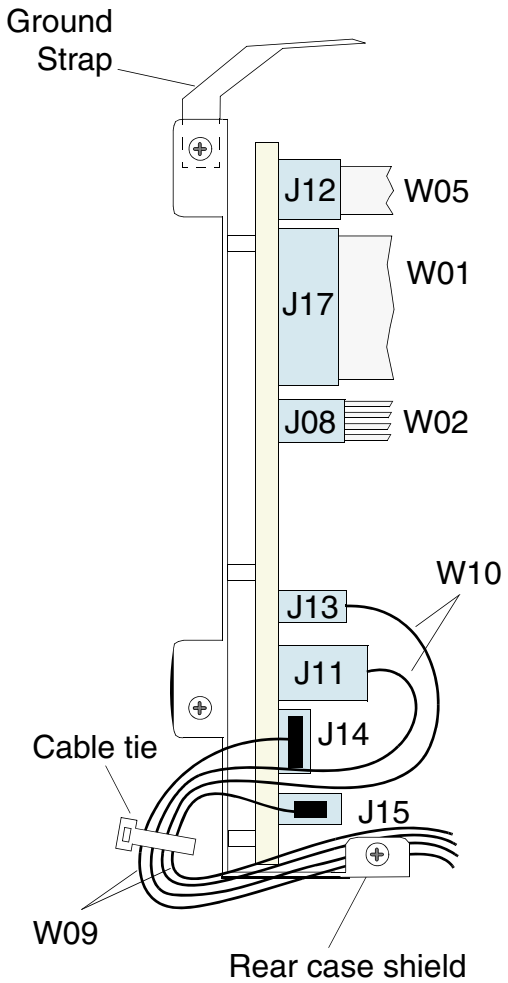
9. Remove the A02 Memory PCB standoffs (**251**) and reuse with the new A01 System PCB assembly.
10. Remove the ECG connector shield and reuse with the new assembly. (System PCB only.)

To install the A01 System PCB, reverse the preceding steps and observe the following:

- Be sure you tighten both the screws and the nuts during reinstallation.
- System PCB only: After device reassembly, you must complete the **TCP – Computer-Assisted Energy Calibration** procedure, because the defibrillator calibration constants are invalidated when you replace the A01 System PCB.

For the next procedure, refer to **Summary of Replacement Procedures**.

A03 Power PCB Replacement



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Some parts mentioned in these steps are optional and may not be a part of your device.

To remove the A03 Power PCB (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning with step 2.
3. Complete the **A06 OEM PCB Replacement** beginning with step 3.
4. For orientation, locate the A03 Power PCB on the **Inside Rear Case**.
5. Complete the **A21 NIBP/A23 CO2 Module Disassembly** procedure steps 3 through 12 to:
   Remove the OEM PCB shield,
   Remove the capacitor bracket,
   Disconnect related cables and tubing,
   Disconnect the CO2 ground strap, and
   Remove the Foam Support Blocks with PCBs.
6. Cut the cable tie securing the W09 and W10 Cable wiring that connects to J11 and J13 (W10) and J14 and J15 (W09).

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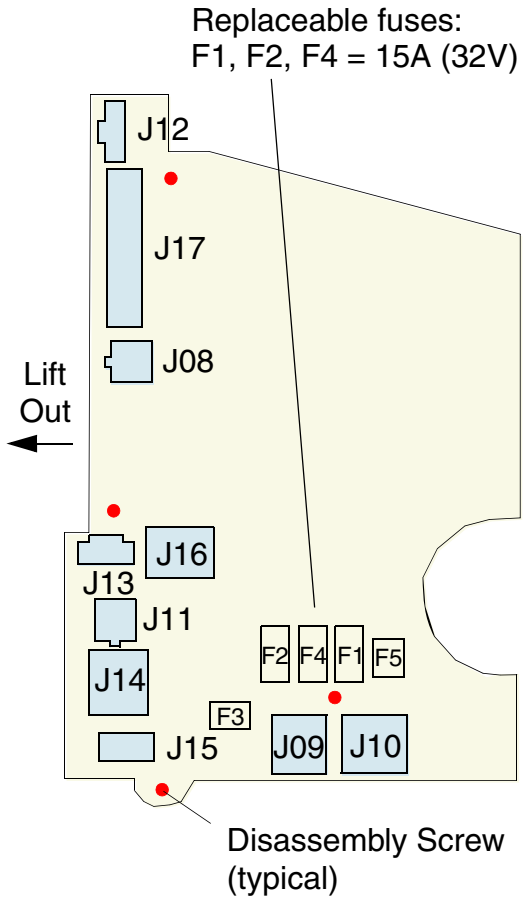
A03 Power PCB Replacement *(continued)*



7. Disconnect the five connectors by pressing the associated retaining clips and disconnecting J12 (W05 Cable) (if not already disconnected), J13 and J11 (W10 Cable), and J14 and J15 (W09 Auxiliary Connector Cable). Cable W01 and Cable W02 were disconnected at the other end during the A06 OEM PCB removal.
8. Remove the two screws (**230**) securing the A03 Power PCB bracket (**62**) to the PC Card bracket (if not already disconnected).
   - Devices with CO2: one screw to the PC Card bracket has a washer and ground strap (**370**) under it.
   - Devices without an A06 OEM PCB: remove the one screw (230) securing the rear case shield (150).
9. Remove the bracket and PCB.
10. Disconnect the two connectors by pressing the associated retaining clip and disconnecting J09 and J10 (W08 System Connector Cable).
11. Remove the four screws (**230**) securing the A03 Power PCB to the mounting bracket, and then remove the A03 Power PCB.

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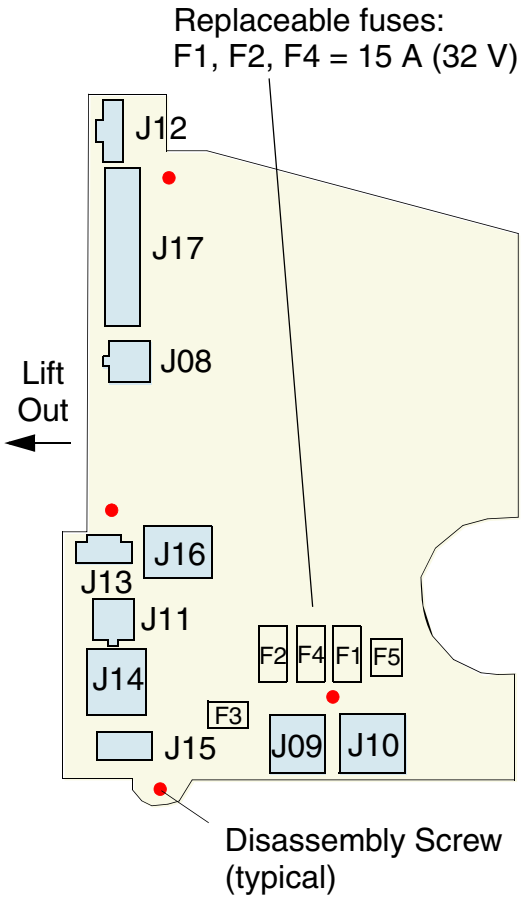
A03 Power PCB Replacement *(continued)*



To install the A03 Power PCB, reverse the previous steps. Observe the following:

1. Connect the W08 System Connector Cable to J09 and J10 before mounting the A03 Power PCB in the case.
2. Replace the cable tie (**222**) to group the W09 and W10 Cable wiring as shown.
3. If an A06 OEM PCB is not installed, the rear case shield (150) goes between the screw head and the bracket near J15. If an A06 OEM PCB is installed, the rear case shield goes between the A06 OEM PCB and the bracket.

For the next procedure, refer to **Summary of Replacement Procedures**, or return to **System PCB/PC Card Slot Cable.**

Fuse Replacement (F3 and F5 are not replaceable):

- F1 – 15A, 32 V. Protects the W08 Auxiliary Connector +18 Vdc output.
- F2 – 15A, 32 V. Protects the Battery 2 charging current.
- F4 – 15A, 32 V. Protects the Battery 1 charging current.

(Continued on next page)

A03 Power PCB Replacement *(continued)*

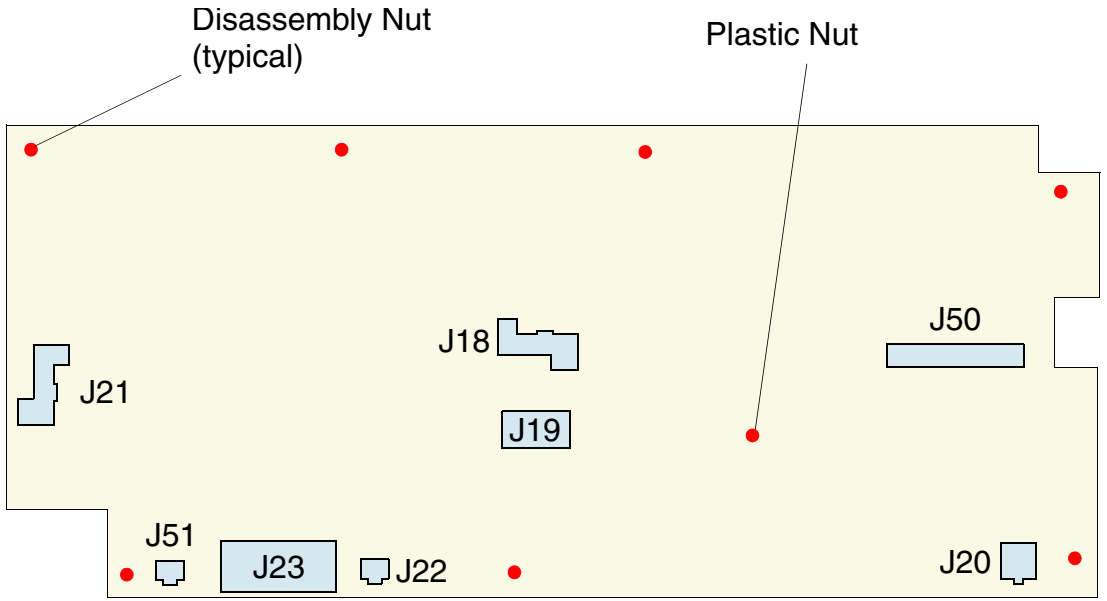
To replace an A03 Power PCB fuse:

1. **Remove the A03 Power PCB**.
2. Pull the old fuse straight out and away from fuse holder.
3. Push the new fuse (F1, F2, or F4) into the fuse holder.

A04 Therapy PCB Replacement—Monophasic Devices

To remove the A04 Therapy PCB (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning with step 2.
3. Place the System/Memory/Therapy PCB device on a protective surface with A01 System PCB face down. Remove the seven nuts (**216**) and one plastic nut. Make sure you loosen the nuts and not the screw posts.



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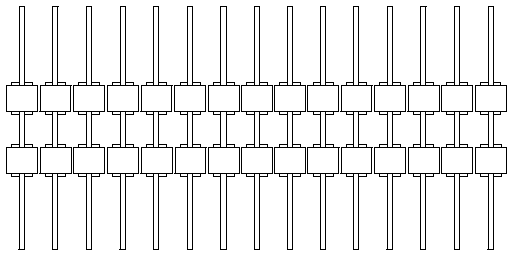
A04 Therapy PCB Replacement—Monophasic Devices *(continued)*



4. Gently lift the A04 Therapy PCB up and away from the A01 System PCB. The two PCBs are linked by the W03 Connector, which is a direct-connection contact assembly (see diagram at left).
5. Remove the W03 Connector, if necessary, from the A04 Therapy PCB.

To install the A04 Therapy PCB, reverse the previous steps.

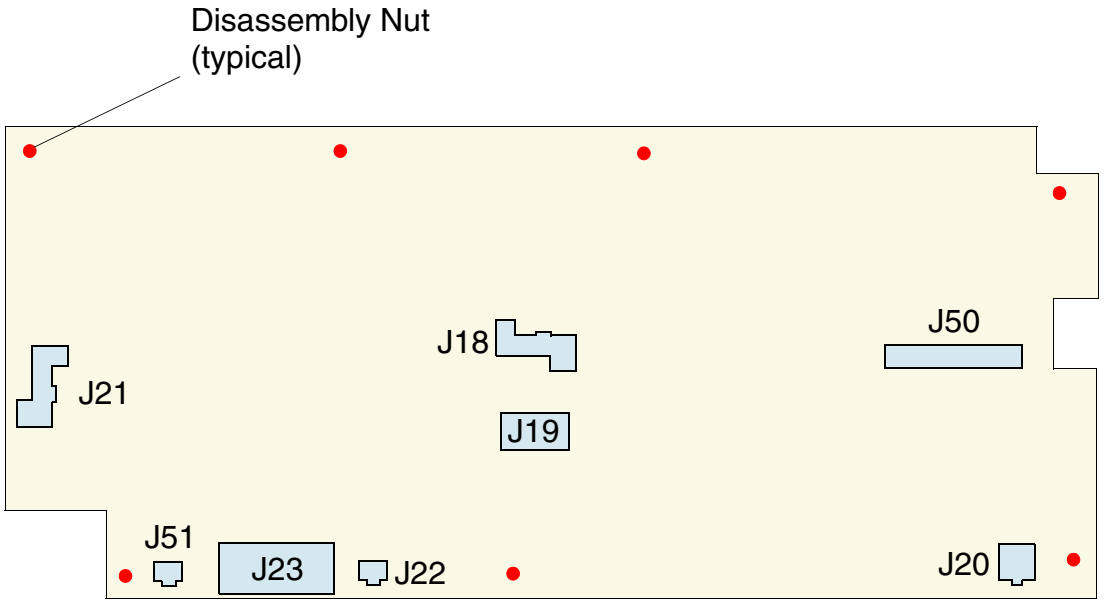
- Lift the shield from the A04 Therapy PCB, and transfer to the new A04 Therapy PCB.
- Tighten screws and nuts during reinstallation.

For the next procedure, refer to **Summary of Replacement Procedures**.

A04 Therapy PCB Replacement—Biphasic Devices

To remove the A04 Therapy PCB (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning with step 2.
3. Place the System/Memory/Therapy PCB device on a protective surface with the A01 System PCB face down. Remove the seven nuts (**216**). Make sure you loosen the nuts and not the screw posts.



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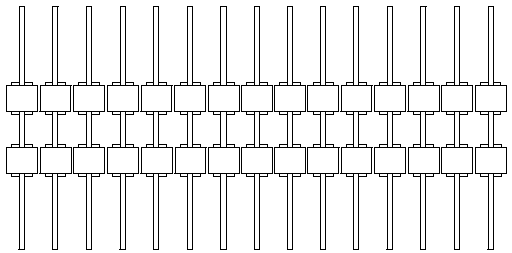
A04 Therapy PCB Replacement—Biphasic Devices *(continued)*

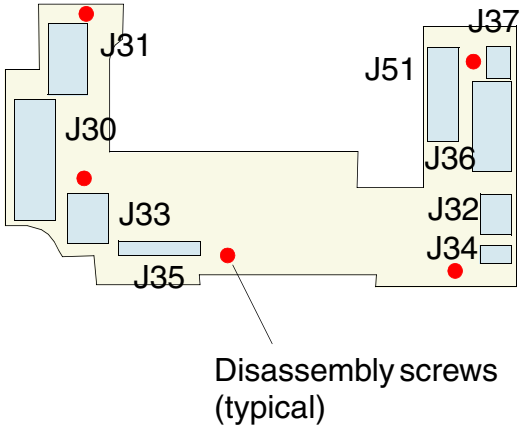


4. Gently lift the A04 Therapy PCB up and away from the A01 System PCB. The two PCBs are linked by the W03 Connector, which is a direct-connection contact assembly (see diagram at left).
5. Remove the W03 Connector, if necessary, from the A04 Therapy PCB.
6. Lift the shield from the A04 Therapy PCB, and transfer to the new A04 Therapy PCB.

To install the A04 Therapy PCB, reverse the previous steps. Tighten both screws and nuts during reinstallation.

For the next procedure, refer to **Summary of Replacement Procedures**.

A05 Interface PCB Replacement



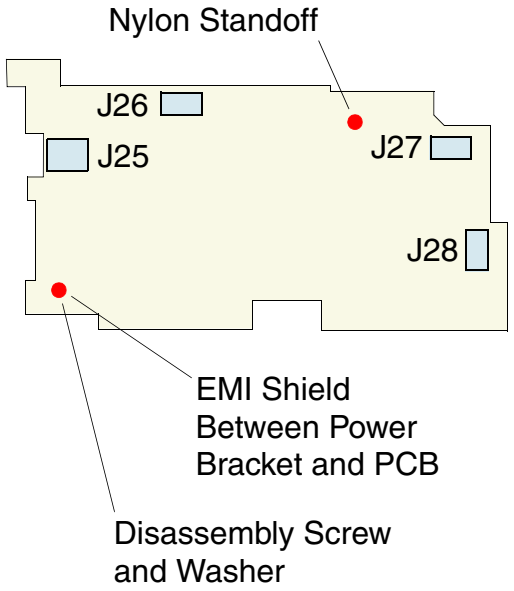
To remove the A05 Interface PCB (front case):

1. Complete the **Case Disassembly** procedure.
2. Locate the A05 Interface PCB on the **Inside Front Case** drawing.
3. Disconnect connectors (from top left, counterclockwise):
   - J31 - Compress the connector retaining clips and disconnect W13 Cable.
   - J30 - Compress the connector retaining clips and disconnect W04 Cable.
   - J33 - Press the connector retaining clip and disconnect W15 Selector Cable.
   - J35 - Spread the connector retaining clips and eject W16 Cable.
   - J34 - Press the connector retaining clip and disconnect W17 Speaker Cable.
   - J32 - Press the connector retaining clip and disconnect W12 Cable.
   - J36 (LCD) - Spread the connector retaining clips and eject W18 Cable.
   - J37 (LCD) - Press the connector retaining clip and disconnect W06 Cable.
   - J51 (EL) - Spread the connector retaining clips and eject W18 Cable.
4. Remove the five screws (**230**).

To install the A05 Interface PCB, reverse the preceding steps. Make sure all the connector retaining clips are positioned to secure their respective connectors and no wires are pinched.

For the next procedure, refer to **Summary of Replacement Procedures**.

A06 OEM PCB Removal/Replacement

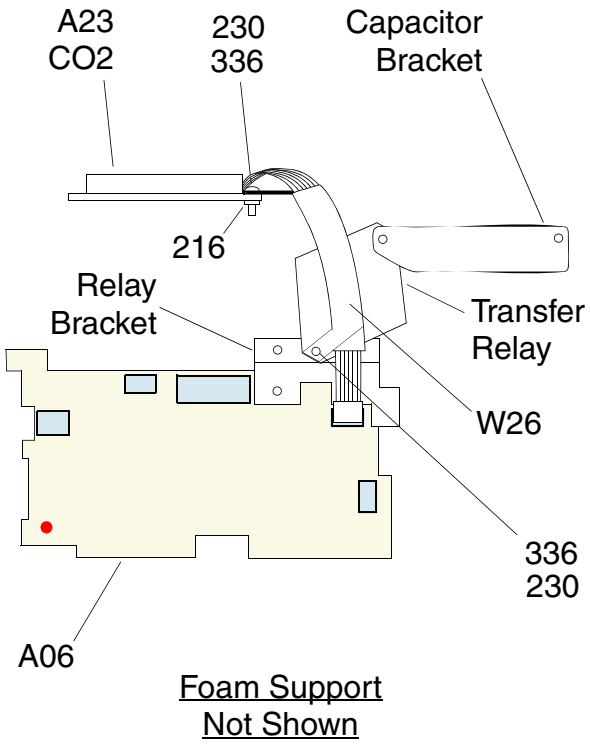


To remove the A06 OEM PCB (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure.
3. For orientation, locate the A06 OEM PCB on the **Inside Rear Case** drawing.
4. Note the position, and then remove the option shield (**144**). Remove the nylon standoff **(248)**.
5. Remove the metal retaining clip (**226**). Disconnect P26 of the W21 Cable from A06 OEM PCB-J26A.
6. Remove the retaining clip and disconnect ribbon cable W27 from A06 OEM PCB-J28.
7. Remove the retaining clip and disconnect cable W26 from the A06 OEM PCB-J27.
8. Remove the screw (**230**) and washer (**336**) (lower-left corner).
9. Lift the right side and then move the A06 OEM PCB, with the OEM shield **(384)** to the right (toward the capacitor) to disengage the direct connection between A06 OEM PCB-J25 and A03 Power PCB-J16. Remove the PCB.

(Continued on next page)

A06 OEM PCB Removal/Replacement *(continued)*



To install the A06 OEM PCB, reverse the preceding steps. Be sure the EMI shield (**150**) is between the screw with washer and the A06 OEM PCB. Also lift the tab at the upper left corner of the A06 OEM PCB over the ground clip on the power bracket, and then press down on the tab while sliding the A06 OEM PCB to the left to engage the direct connection to the A03 Power PCB-J16.

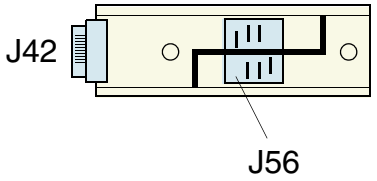
Note: When installing the A06 OEM PCB, ensure that the option shield (**144**) partially covers the W01 System Cable to minimize wear.

For the next procedure, refer to **Summary of Replacement Procedures,** or

Return to:

Power PCB	**Rear Case Replacement—Monophasic**
CO2 Connector Removal	**Rear Case Replacement—Biphasic**
NIBP/CO2 Module Disassembly	**Battery Pins/Power PCB Cable—Monophasic**
	Battery Pins/Power PCB Cable—Biphasic

A07 Smart Contact PCB Replacement



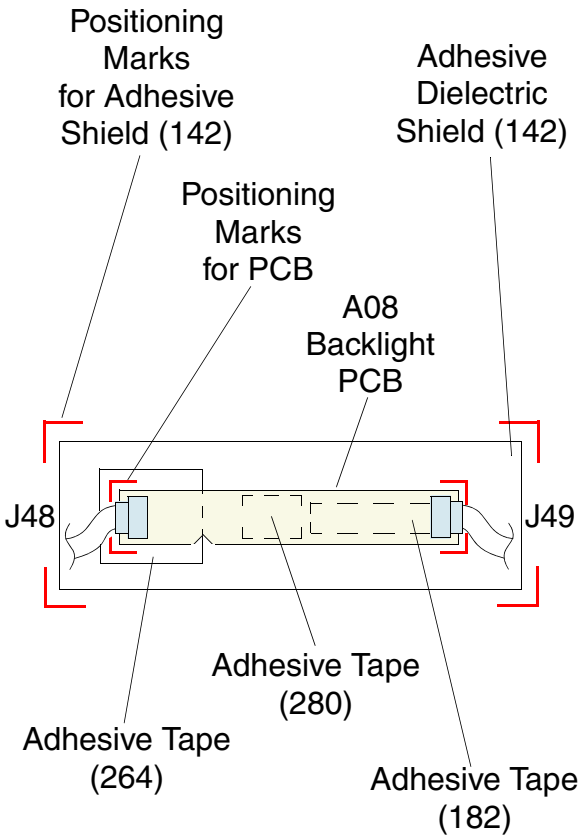
To remove the A07 Smart Contact PCB (from outside the rear case):

1. Lay the device face down on a static-free, non-abrasive surface.
2. Remove the two screws (**232**) from the Battery Retainer (**24**) between the battery wells. Lift away the Battery Retainer. For devices with CO2, unplug the W31 Exhaust Tubing. Do not let the exhaust tubing fall inside the case.
3. Pull the A07 Smart Contact PCB away from the case, and disconnect the W05 Cable at J42. Tape, or otherwise restrain, the W05 Cable so it does not fall inside the case. (J56 is the edge connector for a LIFEPAK SLA battery.)

To install, reverse the preceding steps.

For the next procedure, refer to **Summary of Replacement Procedures**, or return to **Power PCB/Contact PCB Cable**.

A08 Backlight PCB Replacement—LCD Devices



To remove the A08 Backlight PCB (front case):

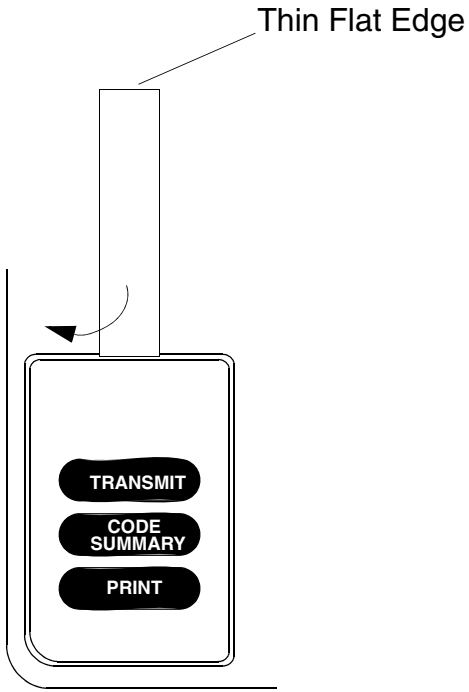
1. Complete the **Case Disassembly** procedure.
2. For orientation, locate the A08 Backlight PCB on the **Inside Front Case** drawing.
3. Remove the A05 Interface PCB.
4. Disconnect the **W06 Cable** at the A08 Backlight PCB-J49.
5. Disconnect A11 LCD Assembly-P48 from A08 Backlight PCB-J48.
6. Gently pry and lift the A08 Backlight PCB off the adhesive strip. Do not damage the underlaying adhesive shield (**142**).

To install the A08 Backlight PCB:

1. Using a soft, lint-free cloth and isopropyl alcohol, gently remove the old adhesive from the adhesive shield (**142**).
2. Apply adhesive tape (**264**) to the adhesive dielectric shield (**142**).
3. Apply new PCB adhesive tape (**182** and **280**) to the A08 Backlight PCB.
4. Apply the A08 Backlight PCB between the inside set of positioning marks.
5. Reconnect A11 LCD Assembly-P48 to A08 Backlight PCB-J48.
6. Reinstall the **W06 Cable**.

For the next procedure, refer to **Summary of Replacement Procedures**, or return to **Front Case Metal Shield.**

A09 Small Keypad Replacement



To remove the A09 Small Keypad (from outside the front case):

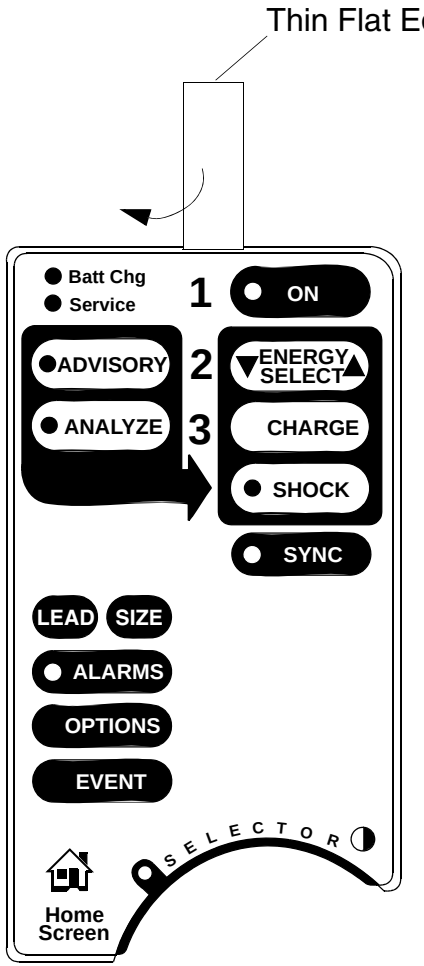
1. Using a very thin, flat-edge tool, gently pry one edge of the A09 Small Keypad until it is released from its adhesive mount. **Do not damage the case**.
2. Pull the A09 Small Keypad away from the case, extending part of the W12 Cable through the keypad opening.
3. Disconnect the W12 Cable from A09 Small Keypad-J41. Make sure the W12 Cable does not fall back into the front case.
4. Using a soft, lint-free cloth and isopropyl alcohol, gently remove the old adhesive from the A09 Small Keypad cavity on the front case.

Note: Before installing the new A09 Small Keypad, verify that the shelf-life date printed on the A09 Small Keypad package has not expired.

To install the A09 Small Keypad, reverse the preceding steps. After you remove the protective covering from the keypad adhesive surface, press the keypad firmly and evenly into the keypad cavity on the front case.

For the next procedure, refer to **Summary of Replacement Procedures**.

A10 Large Keypad Replacement



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Standard Configuration Shown

To remove the A10 Large Keypad (from outside the front case):

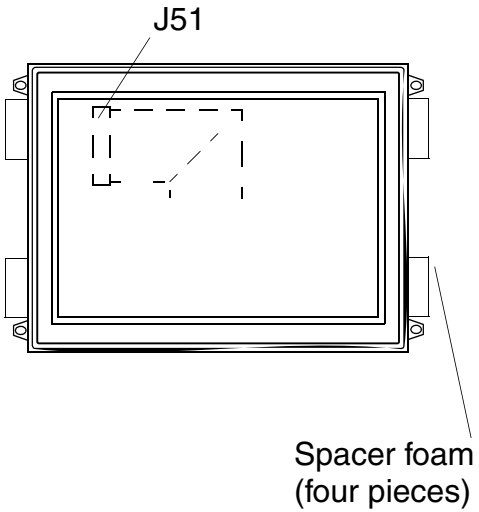
1. Using a wide, very thin, flat-edge tool, gently pry one edge of the A10 Large Keypad until it is released from its adhesive mount. **Do not damage the case.**
2. Pull the A10 Large Keypad away from the case, extending part of the W13 Cable through the keypad opening.
3. Disconnect the W13 Cable from A10 Large Keypad-J39. Make sure the W13 Cable does not fall back into the front case.
4. Using a soft, lint-free cloth and isopropyl alcohol, gently remove the old adhesive from the A10 Large Keypad cavity on the front case.

Note: Before installing the new A10 Large Keypad, verify that the shelf-life date printed on the A10 Large Keypad package has not expired.

To install the A10 Large Keypad, reverse the preceding steps. After you remove the protective covering from the keypad adhesive surface, press the keypad firmly and evenly into the keypad cavity on the front case.

For the next procedure, refer to **Summary of Replacement Procedures**.

A11 EL Display Assembly Replacement



To remove the A11 EL Display Assembly (front case):

1. Complete the **Case Disassembly** procedure.
2. For orientation, locate the A11 EL Display Assembly-P51 connection on the **Inside Front Case** drawing.

   Note: The lens surface is very fragile, will absorb oils from being touched, and can be scratched easily. Remove fingerprints with a lint-free cloth.

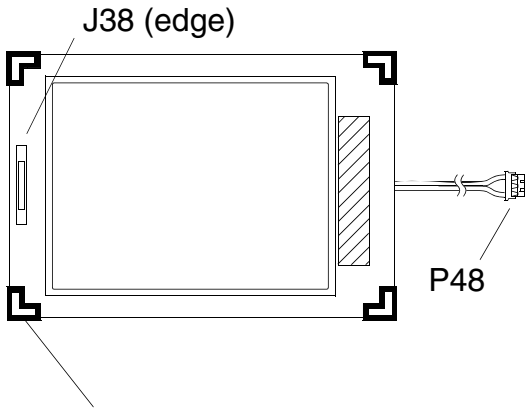
3. Remove the **A05 Interface PCB**. Remove the four screws (**230**). Lift the A11 EL Display Assembly gently away from the front case by lifting up on the corner screw tabs. Remove the four screws to separate the EL Display from its bracket.

To install the A11 EL Display Assembly, reverse the preceding steps. Observe the following:

- Be sure that both the A11 EL Display Assembly screen and the A11 EL Display Assembly Lens are completely clean and dust-free before reinstalling.
- Be sure you orient the A11 EL Display Assembly correctly in the front case, with the ribbon cable folded 90°, oriented toward J51 on the Interface PCB.
- Remember, the lower-left metal shield screw secures the W19 Cable eyelet.

For the next procedure, refer to **Summary of Replacement Procedures**.

A11 LCD Assembly Replacement



To remove the A11 LCD Assembly (front case):

1. Complete the **Case Disassembly** procedure.
2. For orientation, locate the A11 LCD Assembly-P48 and A11 LCD Assembly-J38 connections on the **Inside Front Case** drawing.
3. Conduct the **Front Case Metal Shield Disassembly** procedure.

   Note: The lens surface is very fragile, will absorb oils from being touched, and can be scratched easily. Remove fingerprints with a lint-free cloth.

4. Cut the tie wrap (**222**) securing A11 LCD Assembly-P48 to the tie wrap anchor.
5. Lift the A11 LCD Assembly away from the front case by carefully lifting up on the black rubber corner shock mounts (**6**).

To install the A11 LCD Assembly, reverse the preceding steps.
Observe the following:

- Be sure that both the A11 LCD Assembly screen and the front case lens are completely clean and dust-free before reinstalling.
- Be sure you orient the A11 LCD Assembly correctly in the front case, with the ribbon cable on the right and two-lead cable on the left.

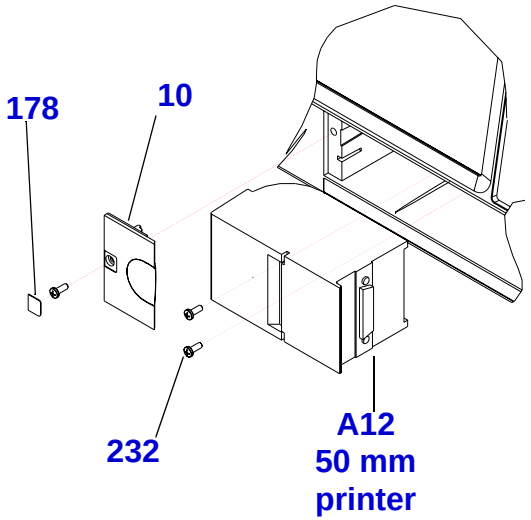
(Continued on next page)

A11 LCD Assembly Replacement *(continued)*

- Remove the rubber corner shock mounts from the old display.
- Position the shock mounts on the corners of new display:
  - Ensure that the two shock mounts with white spacers are on the bottom edge of LCD display.
  - Ensure that the raised portions on the shock mounts face away from the front case lens.
- Replace the tie wrap (222), reattaching A11 LCD Assembly-P48 to the tie wrap anchor.
- Ensure that the W18 Cable from the old display is transferred to the new display.

For the next procedure, refer to **Summary of Replacement Procedures**.

A12 Printer Assembly (50 mm) Replacement



Note: Refer to **A12 Printer Assembly (100 mm) Replacement** for the 100 mm printer replacement procedure.

To remove the A12 Printer Assembly (50 mm) (from outside the front case):

1. Lay the defibrillator face up on the battery wells.
2. Remove the printer paper.
3. Carefully peel away the label (178) from the screw holding the filler panel (10), and remove the screw. Set the panel, screw, and label aside for reuse.
4. Remove the two screws (**232**) from inside the A12 Printer Assembly.

   Note: Some defibrillators use two lock washers in addition to the two screws (A12 Printer Assembly, 50 mm, MIN 804189-02).
5. Gently lift the A12 Printer Assembly edge (on the speaker side) up and toward the speaker to disengage the printer connector.
6. Record the printhead resistance displayed on the printer label (near the motor). An example of this information is R=720.

(Continued on next page)

A12 Printer Assembly (50 mm) Replacement *(continued)*

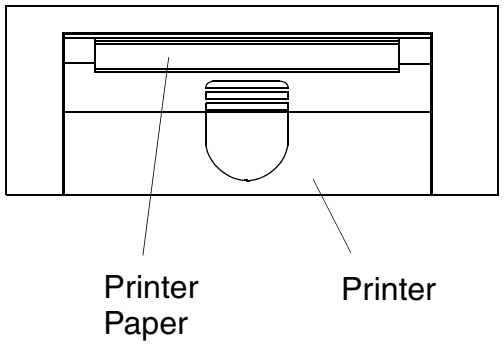
To install the A12 Printer Assembly, reverse the preceding steps. After reassembly, complete the **TCP – Printer Calibration** procedure.

Note: The A12 Printer (50 mm) can be disassembled and repaired. Refer to **A12 Printer (50 mm) Repair Procedures**.

Note: The device software is configured for a specific type of printer. Therefore, the 50 mm and 100 mm printers are not interchangeable.

For the next procedure, refer to **Summary of Replacement Procedures**.

A12 Printer Assembly (100 mm) Replacement



Note: Refer to **A12 Printer Assembly (50 mm) Replacement** for the 50 mm printer replacement procedure.

To remove the A12 Printer Assembly (100 mm) (from outside the front case):

1. Lay the device face up on the battery wells.
2. Remove the printer paper.
3. From the front side, remove the two screws from inside the A12 Printer Assembly.
4. Gently lift the A12 Printer Assembly (on the speaker side) and lift up and over toward the speaker to disengage the printer connector.
5. On the new printer, look at the top metal bracket, near the motor, for the value of the printhead resistance (for example, R=1181). Write this on a piece of paper, and after printer installation, place inside the printer for future reference. Specifically, the printhead resistance value is used when completing the **TCP – Printer Calibration**.

(Continued on next page)

A12 Printer Assembly (100 mm) Replacement *(continued)*

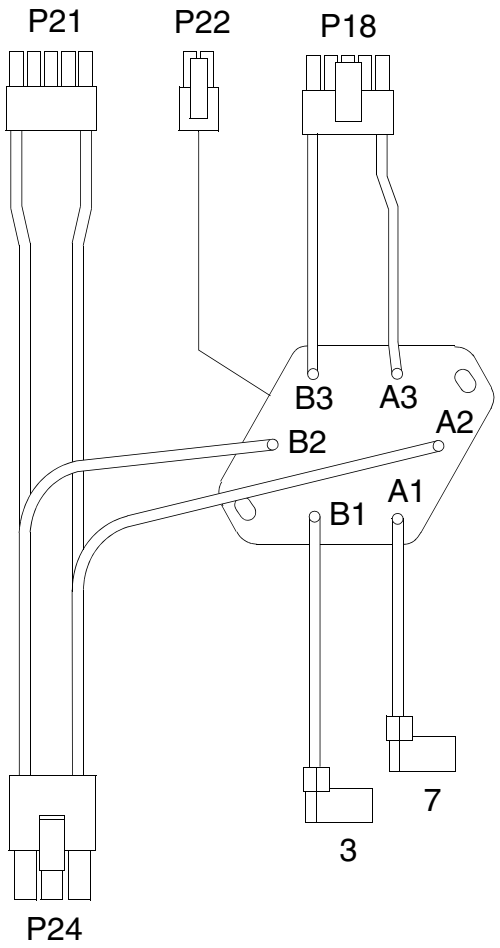
To install the A12 Printer Assembly, reverse the steps on the previous page.

Note: The new printer comes with new screws installed to aid reassembly.

Note: The A12 printer (100 mm) can be repaired (in a limited fashion). Refer to **A12 Printer (100 mm) Repair Procedures**.

Note: The device software is configured for a specific type of printer. Therefore, the 50 mm and 100 mm printers are not interchangeable.

A13 Transfer Relay Assembly Replacement—Monophasic Devices



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To remove the A13 Transfer Relay Assembly (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning with step 2.
3. For orientation, locate the A13 Transfer Relay Assembly on the **Inside Rear Case** drawing.
4. Remove the two screws (**230**) securing the capacitor bracket (**60**).
5. Cut the cable ties that secure the A13 Transfer Relay Assembly wiring.
6. Remove the screw (**230**) securing the clear plastic shield (**32**) to the A17 Interconnect Bracket.
7. Remove the two spade terminals from A17 Interconnect Bracket terminals 3 and 7.
8. Note the orientation of the P22 wiring for reinstallation, and then remove the A13 Transfer Relay Assembly.

(Continued on next page)

A13 Transfer Relay Assembly Replacement—Monophasic Devices

(continued)

To install the A13 Transfer Relay Assembly, reverse the steps on the previous page. Observe the following:

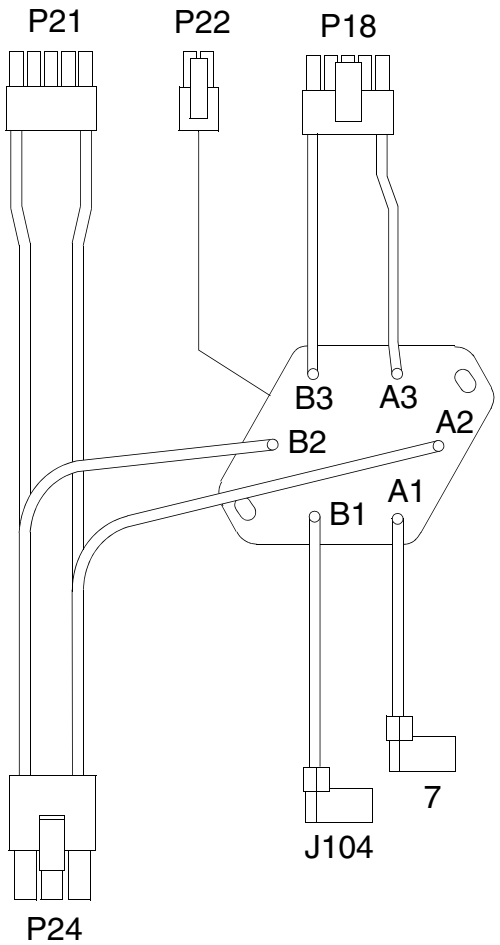
- The coil end of the A13 Transfer Relay Assembly fits in a recess in the case.
- Note the spade terminal labels when connecting to the A17 Interconnect Bracket.
- See the **Energy Transfer Detail Drawing** for cable tie locations.
- After device reassembly, you must complete the **TCP – Energy Calibration** procedure because the defibrillator calibration constants are invalidated when you replace the A13 Transfer Relay Assembly.

For the next procedure, refer to **Summary of Replacement Procedures**, or

Return-to:

Rear Case Replacement	**Battery Pins/Power PCB Cable**

A13 Transfer Relay Assembly Replacement—Biphasic Devices



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To remove the A13 Transfer Relay Assembly (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning with step 2.
3. For orientation, locate the A13 Transfer Relay Assembly on the **Inside Rear Case** drawing.
4. Remove the two screws (**230**) securing the capacitor bracket (**60**).
5. Cut the cable ties that secure the A13 Transfer Relay Assembly wiring.
6. Remove the screw (**230**) securing the clear plastic shield (**32**) to the A17 Interconnect Bracket.
7. Remove the spade terminals at A17 Interconnect Bracket positions 3, 6, 7, and 9.
8. Remove the two screws (**230**) securing the A22 Biphasic PCB bracket (**324**) to the rear case.
9. Partially lift the A22 Biphasic PCB bracket and remove spade terminal connection J104. Remove the PCB and bracket from the case.
10. Note the orientation of the P22 wiring for reinstallation, and then remove the A13 Transfer Relay Assembly.

(Continued on next page)

A13 Transfer Relay Assembly Replacement—Biphasic Devices

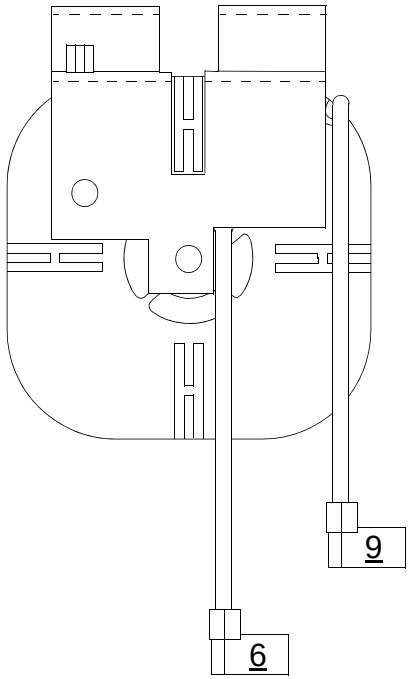
(continued)

To install the A13 Transfer Relay Assembly, reverse the steps on the previous page. Observe the following:

- The coil end of the A13 Transfer Relay Assembly fits in a recess in the case.
- Note the spade terminal labels when connecting to the A17 Interconnect Bracket.
- See the **Energy Transfer Detail Drawing** for cable tie locations.
- After device reassembly, you must complete the **TCP – Energy Calibration** procedure, because the defibrillator calibration constants are invalidated when you replace the A13 Transfer Relay Assembly.

For the next procedure, refer to **Summary of Replacement Procedures**, or return to **Rear Case Replacement.**

A14 Waveshaping Inductor Replacement—Monophasic Devices



To remove the A14 Waveshaping Inductor (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning with step 2.
3. Locate the A14 Waveshaping Inductor on the **Inside Rear Case** drawing.
4. Remove the screw (**230**) securing the clear plastic shield (**32**) to the A17 Interconnect Bracket.
5. Cut the cable tie (**222**) that secures the A14 Waveshaping Inductor wiring.
6. Remove the two spade lug connections from the A14 Waveshaping Inductor to the A17 Interconnect Bracket terminals 6 and 9. A gripping tool may be necessary.
7. Remove the two screws (**230**) securing the A14 Waveshaping Inductor to the rear case, and then remove the A14 Waveshaping Inductor with bracket.
8. Remove the screw (**230**) securing the inductor to the bracket (**52**).

(Continued on next page)

A14 Waveshaping Inductor Replacement—Monophasic Devices

(continued)

To install the A14 Waveshaping Inductor, reverse the steps on the previous page. Observe the following:

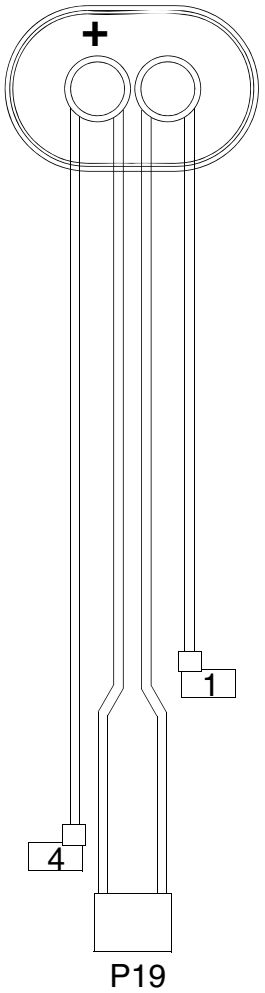
- Note the spade terminal labels when connecting to the A17 Interconnect Bracket.
- See the **Energy Transfer Detail Drawing**, as required.
- After device reassembly, you must complete the **TCP – Energy Calibration** procedure, because the defibrillator calibration constants are invalidated when you replace the A14 Waveshaping Inductor Assembly.

For the next procedure, refer to **Summary of Replacement Procedures**, or

Return-to:

Rear Case Replacement	**Battery Pins/Power PCB Cable**

A15 Energy Storage Capacitor Replacement—Monophasic Devices



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To remove the A15 Energy Storage Capacitor (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning with step 2.
3. Locate the A15 Energy Storage Capacitor on the **Inside Rear Case** drawing.
4. Remove the two screws (**230**) securing the capacitor bracket (**60**).
5. Cut the cable ties (**222**) that secure the capacitor wiring.
6. Remove the screw (**230**) securing the clear plastic shield (**32**) to the A17 Interconnect Bracket.
7. Remove all spade terminals from the A17 Interconnect Bracket terminals. A gripping tool may be necessary.
8. Observing orientation, cut the large tie wrap (**224**) securing the A15 Energy Storage Capacitor and A17 Interconnect Bracket to the rear case. Remove A15 and A17.

(Continued on next page)

A15 Energy Storage Capacitor Replacement—Monophasic Devices

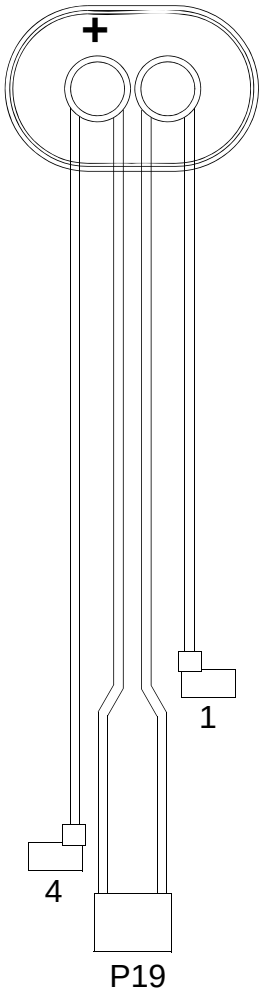
(continued)

To install the A15 Energy Storage Capacitor, reverse the steps on the previous page. Observe the following:

- Transfer the shields from the old capacitor to the new capacitor.
- Note the spade terminal labels when connecting to the A17 Interconnect Bracket.
- See the **Energy Transfer Detail Drawing** for cable tie locations.

For the next procedure, refer to **Summary of Replacement Procedures**, or return to **Battery Pins/Power PCB Cable.**

A15 Energy Storage Capacitor Replacement—Biphasic Devices



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To remove the A15 Energy Storage Capacitor (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning with step 2.
3. Locate the A15 Energy Storage Capacitor on the **Inside Rear Case** drawing.
4. Remove the two screws (**230**) securing the capacitor bracket (**60**).
5. Cut the cable ties (**222**) that secure the capacitor wiring.
6. Remove the screw (**230**) securing the clear plastic shield (**32**) to the A17 Interconnect Bracket.
7. Remove all spade terminals from the A17 Interconnect Bracket terminals. A gripping tool may be necessary.
8. Remove the two screws (**230**) securing the A22 Biphasic PCB bracket (**324**) to the rear case.
9. Partially lift the A22 Biphasic PCB bracket and remove spade terminal connection J104. Remove the PCB with bracket.
10. Observing orientation, cut the large tie wrap (**224**) securing the A15 Energy Storage Capacitor and A17 Interconnect Bracket to the rear case. Remove A15 and A17.

(Continued on next page)

A15 Energy Storage Capacitor Replacement—Biphasic Devices

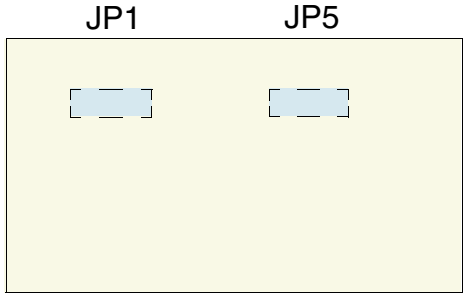
(continued)

To install the A15 Energy Storage Capacitor, reverse the steps on the previous page. Observe the following:

- Transfer the shields from the old capacitor to the new capacitor.
- Note the spade terminal labels when connecting to the A17 Interconnect Bracket.
- See the **Energy Transfer Detail Drawing** for cable tie locations.

For the next procedure, refer to **Summary of Replacement Procedures**.

A16 SpO2 PCB Replacement, Nellcor



To remove the A16 SpO2 PCB (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning with step 2.
3. Complete the **A06 OEM PCB Replacement** procedure beginning with step 3.
4. For orientation, refer to **Inside Rear Case**.

   Remove the OEM PCB Shield (**384**).
5. Remove the two screws (**230**) securing the capacitor bracket (**60**). Remove the bracket.
6. Move the relay out of the way.
7. Remove the two screws (**230**) securing the relay bracket (**46**) to the case. Remove the bracket.
8. Remove the retaining clip (**226**) and disconnect the W22 Cable from the A16 SpO2 PCB-JP1. (Cable W21 at JP5 was disconnected at the other end during A06 OEM removal.)

(Continued on next page)

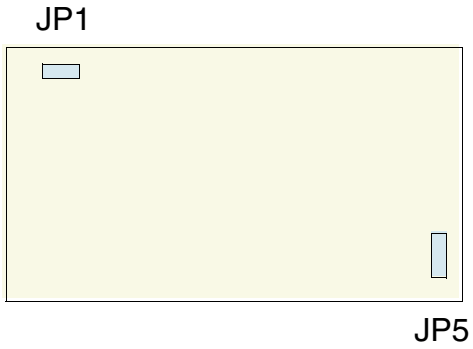
A16 SpO2 PCB Replacement, Nellcor *(continued)*

9. Remove the Upper Foam Support (**22**).
10. Lift out the A16 SpO2 PCB.

To install the A16 SpO2 Module, reverse the preceding steps.

For the next procedure, refer to **Summary of Replacement Procedures**.

A16 SpO2 PCB Replacement, Masimo



To remove the A16 SpO2 PCB (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning with step 2.
3. Complete the **A06 OEM PCB Replacement** procedure beginning with step 3.
4. For orientation, refer to **Inside Rear Case**.

   Remove the OEM PCB Shield (**384**).
5. Remove the two screws (**230**) securing the capacitor bracket (**60**). Remove the bracket.
6. Remove the screw (**230**) from the **A13 Relay**, leaving the wiring connected, and then move the relay out of the way.
7. Remove the two screws (**230**) securing the relay bracket (**46**) to the case. Remove the bracket.
8. Lift **A16 SpO2 PCB** and the upper foam **(22)** out of the rear case together. Pass A16 back through the hole in the upper foam. Set the foam aside.

(Continued on next page)

A16 SpO2 PCB Replacement, Masimo *(continued)*

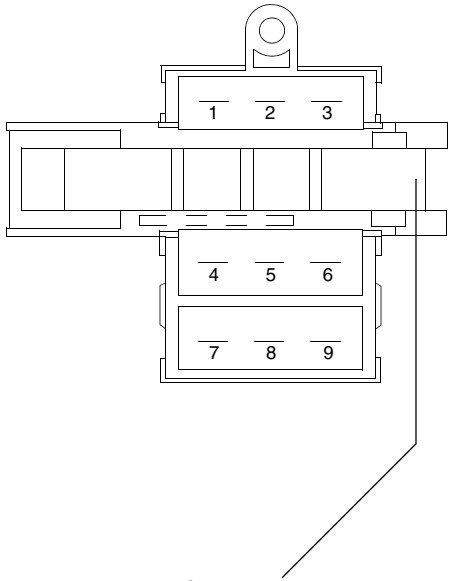
9. Turn A16 over and remove the screw holding the W22 Cable to A16 SpO2 PCB-JP1. Set the screw aside.
10. Disconnect the W22 Cable at A16 SpO2 PCB-JP1. (Cable W21 at JP5 was disconnected at the other end during A06 OEM removal.)

To install the A16 SpO2 Module, reverse the preceding steps.

Note: Apply 4 ft/lbs torque when reinstalling the screw holding the W22 Cable to A16 SpO2 PCB-JP1 and W21 cable to A16 SpO2 PCB-JP5

For the next procedure, refer to **Summary of Replacement Procedures**.

A17 Interconnect Bracket Replacement



To remove the A17 Interconnect Bracket (rear case):

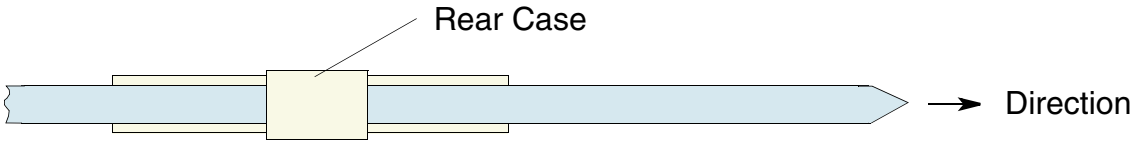
1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning with step 2.
3. Locate the A17 Interconnect Bracket on the **Inside Rear Case** drawing.
4. Remove the two screws (**230**) securing the capacitor bracket (**60**).
5. Remove the screw (**230**) securing the clear plastic shield (**32**) to the A17 Interconnect Bracket.
6. Cut the cable ties (**222**) that secure the A17 Interconnect Bracket wiring.
7. Remove all spade terminals from the A17 Interconnect Bracket terminals. A gripping tool may be necessary.
8. Cut the large tie wrap (**224**) securing the A17 Interconnect Bracket.

(Continued on next page)

A17 Interconnect Bracket Replacement *(continued)*

To install the A17 Interconnect Bracket, reverse the preceding steps. Observe the following:

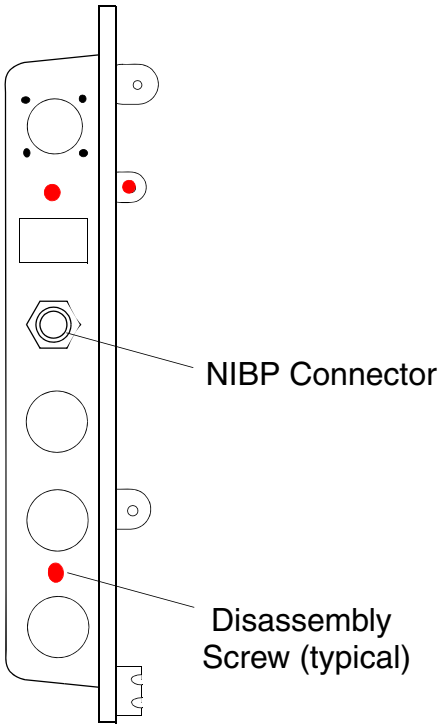
1. Feed the large tie through the left hole of the bracket, then the rear case, then the right hole of the bracket. Tighten so the tie collar fits in the bracket recess.



2. Note the spade terminal labels when connecting to the A17 Interconnect Bracket.
3. See the **Energy Transfer Detail Drawing for Biphasic** or **Energy Transfer Detail Drawing for Monophasic** for cable tie locations.

For the next procedure, refer to **Summary of Replacement Procedures**.

NIBP Connector Removal



To remove the NIBP Connector (Parameter Bezel):

Note: These steps include the A06 OEM PCB and all options on the Parameter Bezel. Your device may not have some of these options.

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning with step 2.
3. Complete the **A06 OEM PCB Replacement** procedure beginning with step step 3.
4. Complete the **Parameter Bezel Removal** procedure beginning with step step 2.
5. Remove the NIBP tube (**378**) from the NIBP Connector (**346**).

   Note: If the NIBP tube has been disconnected/reconnected from the fitting once or twice in the past, the tube end should be trimmed to maintain an airtight seal.

6. Remove the fitting nut on the back side of the bezel to remove the connector (**346**) and seal (**348**).

(Continued on next page)

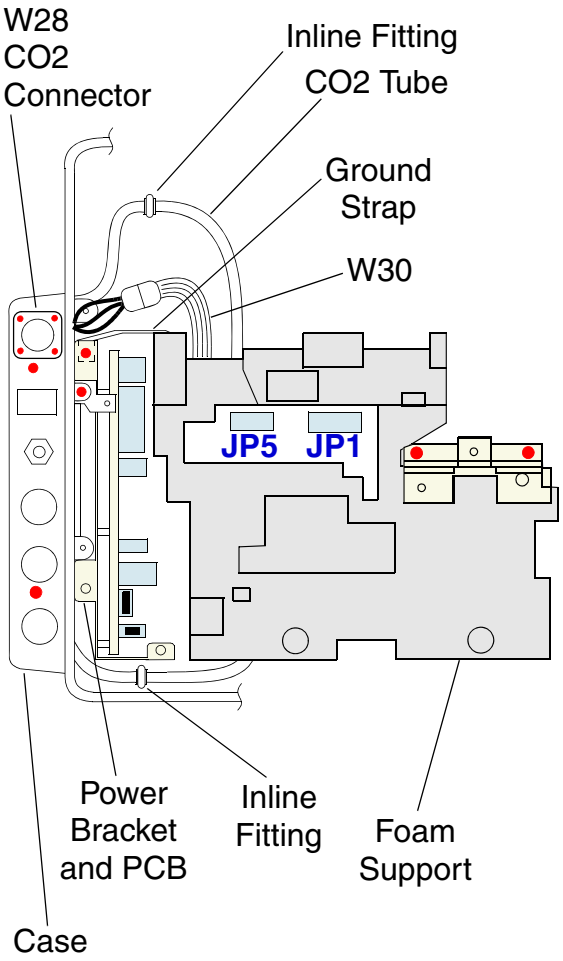
NIBP Connector Removal *(continued)*

To install the new NIBP Connector, reverse the steps on the previous page and observe the following:

- Apply the Parameter Bezel Label (**158**) to the new bezel front prior to installing the Cover (**356**) onto the CO2 Adapter.

For the next procedure, refer to **Summary of Replacement Procedures**.

A21 NIBP/A23 CO2 Module Disassembly



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The A21 NIBP, A23 CO2, and A16 SpO2 PCBs are sandwiched between the Lower Foam Support (**20**) and Upper Foam Support (**22**). Some devices may not have all of these options.

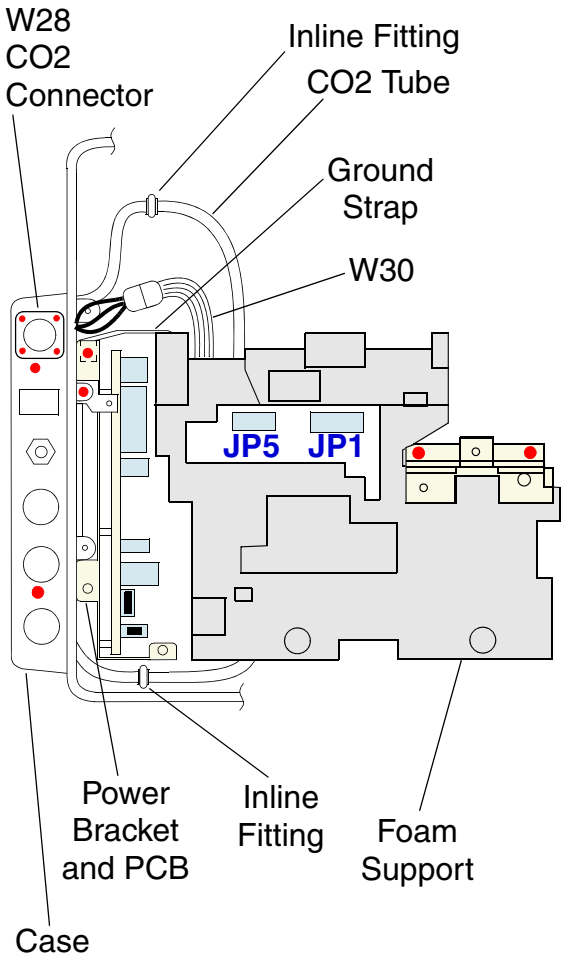
Note: The CO2 Connector must be replaced with the PCB. Refer to **W28 CO2 Connector Removal.**

To remove the A21 NIBP and A23 CO2 PCBs as a device (with the A16 SpO2 PCB):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning with step 2.
3. Complete the **A06 OEM PCB Replacement** procedure beginning with step 3.
4. For orientation, refer to **Inside Rear Case**, page 2 of 3.
5. Remove the OEM PCB Shield (**384**).
6. Remove the two screws (**230**) securing the capacitor bracket (**60**). Remove the bracket.
7. Move the relay out of the way.
8. Remove the two screws (**230**) securing the relay bracket (**46**). Remove the bracket.

(Continued on next page)

A21 NIBP/A23 CO2 Module Disassembly *(continued)*



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9. Remove the metal retaining clip (**226**) and disconnect the W22 SpO2 Connector Cable at A16 SpO2 Module-JP1. (Cable W21 at JP5 was disconnected at the other end during A06 OEM removal.)
10. Lift the Upper Foam Support off the Lower Foam Support.
11. Disconnect the NIBP PCB tube (**378**) at the barbed inline fitting. (Ribbon cable W27 at J2 was disconnected at the other end during A06 OEM removal.)
12. Disconnect the CO2 connector cable (coming from the bezel) from Adapter Cable W30.
13. Remove the CO2 tube (coming from the bezel) from the routing clip, and then disconnect it from the CO2 jumper tube at the barbed inline fitting. (Ribbon cable W26 at J4 was disconnected at the other end during A06 OEM removal.)
14. Remove the screw (**230**) from the power bracket to free the ground strap (**370**) that is attached to the CO2 PCB.
15. Lift the Lower Foam Support and PCBs out of the case as one unit far enough to unplug the black CO2 exhaust tube. Remove the Lower Foam Support from the rear case.

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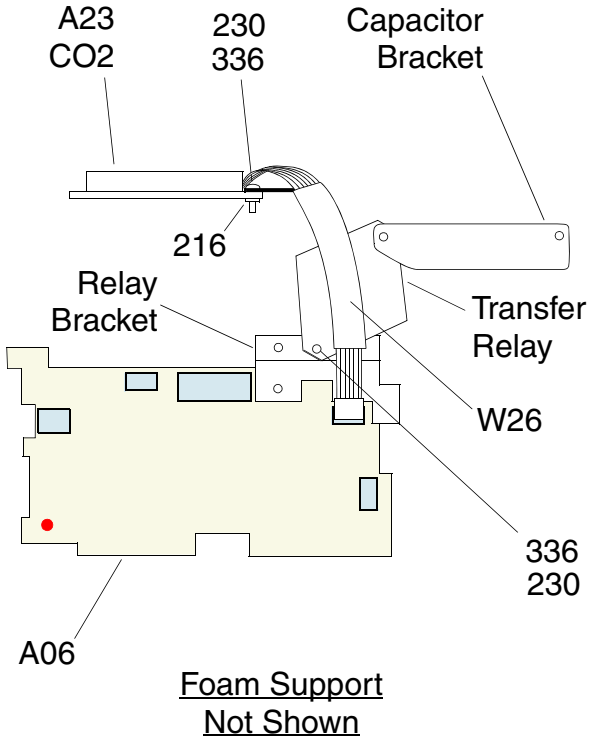
A21 NIBP/A23 CO2 Module Re-assembly *(continued)*



16. Lift A21 NIBP PCB out.

Caution!

Possible Skin Burns. Do not open the CO2 scrubber device (part of the CO2 module). Scrubber material may cause caustic burns. If scrubber material comes in contact with skin, rinse the area of contact thoroughly with water. If scrubber material comes in contact with eyes, flush eyes with water for 15 minutes and seek immediate medical attention.

17. Lift A23 CO2 PCB out.

To install A21 NIBP, A23 CO2, and A16 SpO2 PCBs, reverse the preceding steps. Observe the following:

- The A23 CO2 PCB must have W30 adapter cable and ground strap (370) connected to it before inserting it into the Lower Foam Support. Route W30 cable end must be accessible for later access.
- The A21 NIBP PCB must have the W27 cable and W29 tubing connected to it before inserting it into the Lower Foam Support. Route W27 cable down the center of the PCB between the components, and then lay W29 tubing on top of it.
- The A21 NIBP PCB must also have two hex standoffs on the far side before inserting it into the Lower Foam Support.

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(Continued on next page)

A21 NIBP/A23 CO2 Module Re-assembly *(continued)*

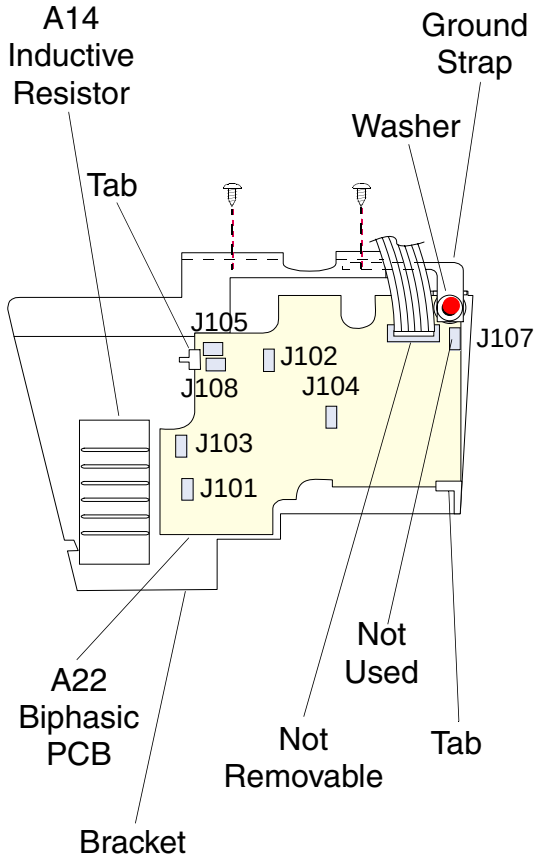
- If the NIBP tube has been disconnected/reconnected from the inline fitting previously, each tube end should be trimmed to maintain an airtight seal.
- The Upper Foam Support must have a Nomex OEM PCB Shield (**384**) between it and the A06 OEM PCB.

For the next procedure, refer to **Summary of Replacement Procedures**, or

Return to:

Power PCB	**Rear Case Replacement—Biphasic**
Battery Pins/Power PCB Cable	**Rear Case Replacement Monophasic**

A22 Biphasic PCB/A14 Inductive Resistor Replacement—Biphasic Devices



To remove the A22 Biphasic PCB and/or the A14 Inductive Resistor (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning with step 2.
3. Locate the A22 Biphasic PCB on the **Inside Rear Case** drawing.
4. Remove the screw (**230**) securing the clear plastic shield (**32**) to the A17 Interconnect Bracket.
5. Cut the three small cable ties (**222**) that secure the **A22 Biphasic PCB wiring**.
6. Remove the three spade terminal connections at the A17 Interconnect Bracket terminals 3, 6, and 9. A gripping tool may be necessary.
7. Remove the two screws (**230**) securing the A22 Biphasic PCB bracket (**324**) to the rear case.
8. Partially lift the A22 Biphasic PCB bracket and remove spade terminal connection J104. Remove the PCB with bracket.

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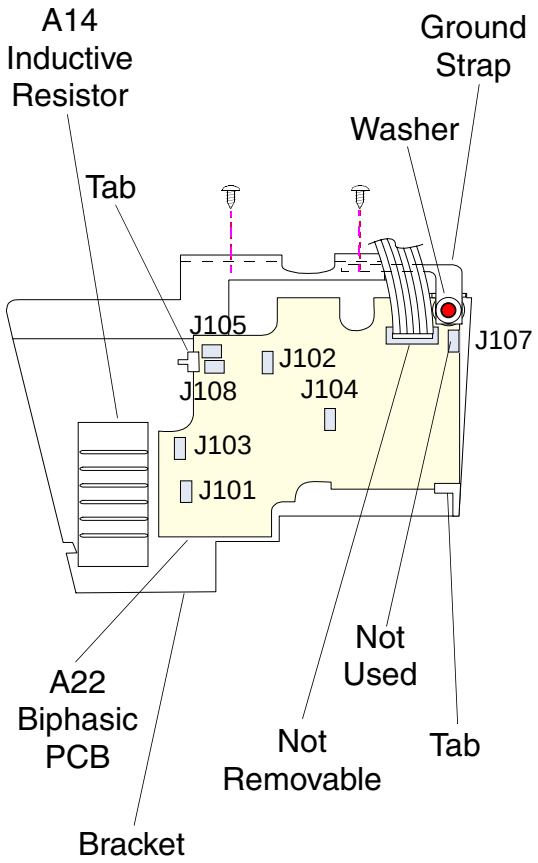
(Continued on next page)

A22 Biphasic PCB/A14 Inductive Resistor Replacement—Biphasic Devices *(continued)*



9. Remove spade terminals J102 and J108 from the PCB.
10. The A14 Inductive Resistor may be removed from the bracket before removing the PCB from the bracket. To remove the Inductive Resistor from the bracket (**324**), pull firmly. It will snap out. A14 Inductive Resistor removal is complete.
11. To continue removing the A22 Biphasic PCB, remove the screw (**230**), washer (**336**), and ground strap (**374**) from the PCB.
12. Remove the A22 Biphasic PCB from the bracket as follows:
    a. Orient the PCB bracket as shown in the diagram (with the mounting tabs on top and one PCB mounting hole in the upper right corner).
    b. Slide the PCB to the right slightly.
    c. Rotate the PCB counterclockwise to clear the tab at the lower right corner.
    d. Pull the PCB to the right as you lift it out.

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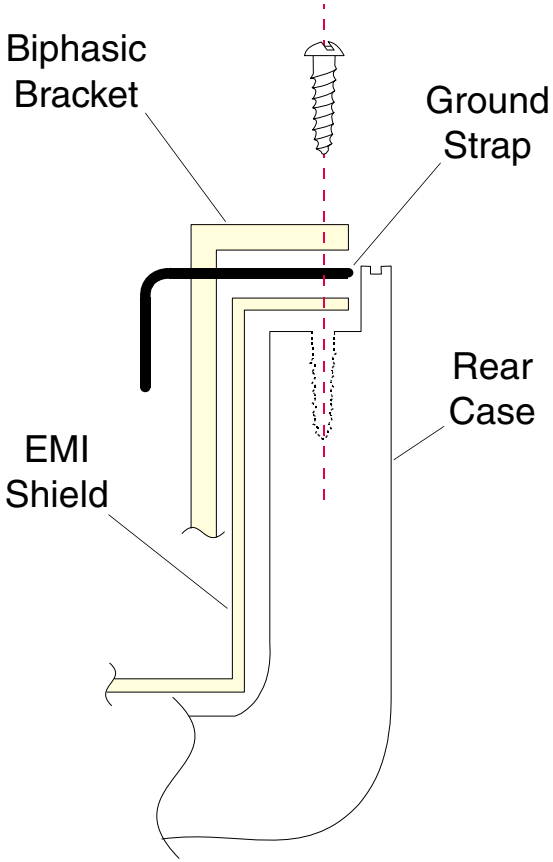
A22 Biphasic PCB/A14 Inductive Resistor Replacement—Biphasic Devices *(continued)*



Section View

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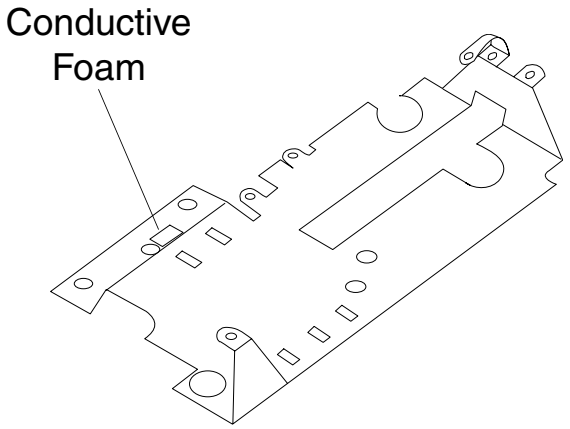
To install the A22 Biphasic PCB, reverse the preceding steps, in addition to following the steps below.

1. Install the A22 Biphasic PCB into the bracket as follows:
   a. Orient the PCB and bracket as shown in the diagram on the previous page (with the mounting tabs on top and one PCB mounting hole in the upper right corner).
   b. Direct the lower left corner of the PCB into place with the PCB rotated counterclockwise about 5° (just enough to clear the tab at the lower right corner).
   c. Slide the PCB to the left into place. (The PCB is in place when the PCB hole is lined up with the threaded hole in the bracket.)
4. Install the Inductive Resistor (**A14**) into the bracket (**324**) with the wires pointing away from the bracket. Twist the wires together and plug the spade terminal connections onto spades J102 and J108 on the A22 Biphasic PCB. After the PCB and bracket are reinstalled, push the Inductive Resistor wires deep into the case.

Note: The ground strap (**374**) must contact the EMI Shield.

For the next procedure, refer to **Summary of Replacement Procedures.**

EMI Shield Replacement — Older



To remove the EMI Shield (**150**), rear case:

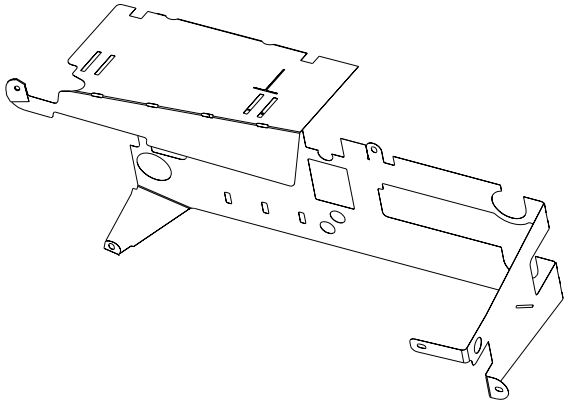
1. Complete the **W10 Battery Cable Replacement—Monophasic** or the **W10 Battery Cable Replacement—Biphasic** procedure.
2. Lift the EMI Shield up and out.

To install the EMI Shield, reverse the preceding steps. Observe the cable tie replacement when reinstalling.

Note: The newly installed EMI Shield should have a conductive foam strip on it where the CO2 PCB is installed (see diagram at left).

For the next procedure, refer to **Summary of Replacement Procedures**.

EMI Shield Replacement — Later



To remove the EMI Shield (**150**), rear case:

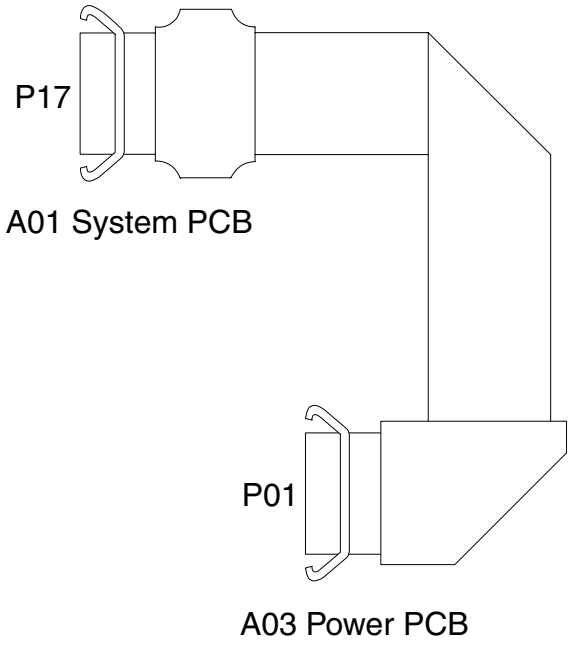
1. In the later EMI shield design, the shield is supplied as part of the Rear Case. Follow the instructions in **Rear Case Replacement Procedure**.

To install the EMI Shield, reverse the steps in **Rear Case Replacement Procedure**. Observe the cable tie replacement when reinstalling.

Note: Conductive foam and cable tie mounts that were separate pieces in the older shield design are built into the new shield design.

For the next procedure, refer to **Summary of Replacement Procedures**.

W01 Power PCB/System PCB Cable Replacement



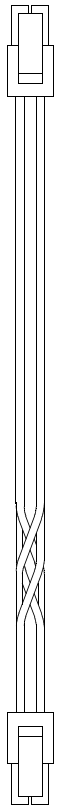
To remove the W01 Cable (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning with step 2.
3. For orientation, locate A03 Power PCB-J17 on the **Inside Rear Case** drawing. (The Therapy PCB-J20 end of the W02 Cable was disconnected as part of step 2.)
4. Compress the connector retaining clips and disconnect the W01 Cable at A03 Power PCB-J17.

To install the W01 Cable, reverse the preceding steps.

For the next procedure, refer to **Summary of Replacement Procedures**.

W02 Power PCB/Therapy PCB Cable Replacement



To remove the W02 Cable (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure.
3. For orientation, locate A03 Power PCB-J08 on the **Inside Rear Case** drawing.
4. Compress the connector retaining clip and disconnect the W02 Cable at A03 Power PCB-J08.

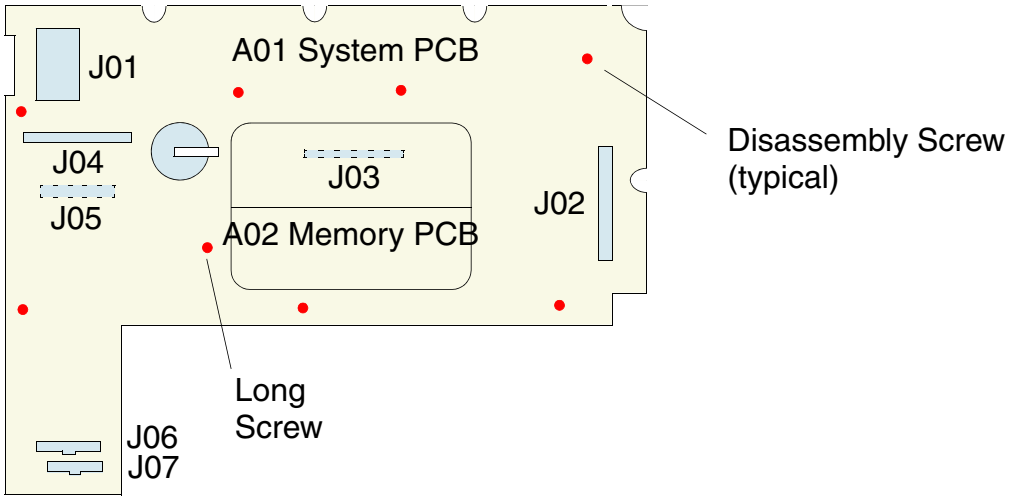
To install the W02 Cable, reverse the preceding steps.

For the next procedure, refer to **Summary of Replacement Procedures**.

W03 System PCB/Therapy PCB Connector Replacement

To remove the W03 Connector (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning with step 2.
3. Place the System/Memory/Therapy PCB device with A01 System PCB face up. Remove the seven screws (**230**) and then the one screw (**296**). Make sure you loosen the screws and not the screw posts.



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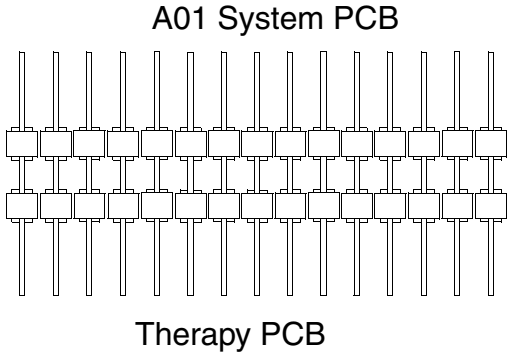
W03 System PCB/Therapy PCB Connector Replacement

(continued)

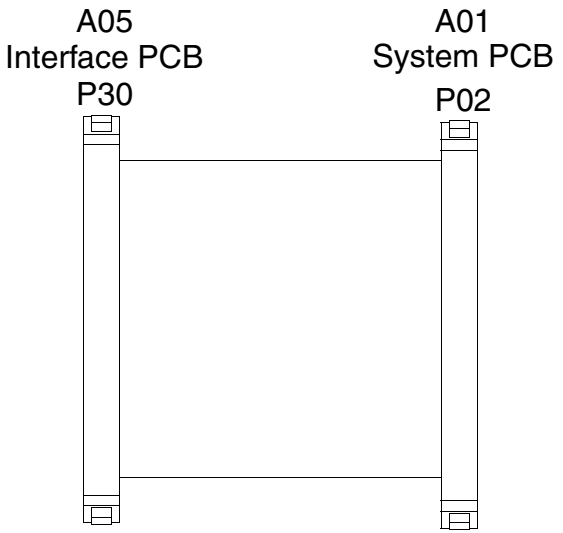


4. Gently lift the A01 System PCB/A02 Memory PCB up and away from the Therapy PCB. The two PCBs are linked by the W03 Connector, which is a direct-connection contact assembly (see diagram at left).
5. Remove the W03 Connector from the PCB that has the contact assembly.

To install the W03 Connector, reverse the preceding steps.

For the next procedure, refer to **Summary of Replacement Procedures**.

W04 System PCB/Interface PCB Cable Replacement



To remove the W04 Cable (front case):

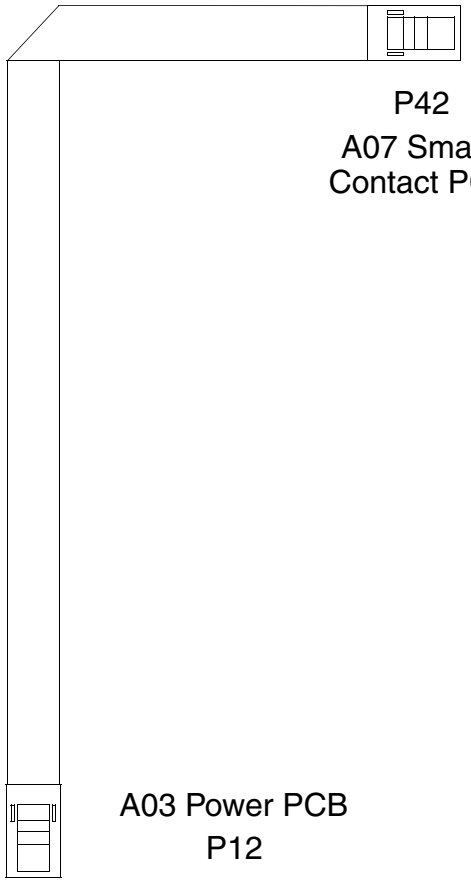
1. Complete the **Case Disassembly** procedure. This procedure removes the W04 Cable from A01 System PCB-J02.
2. For orientation, locate the W04 Cable on the **Inside Front Case** drawing.
3. Compress the connector retaining clips to unlock the connector, and disconnect the W04 Cable at A01 System PCB-J02.

Note: Notice the cable markings J02 and J30 during reinstallation. If this cable is installed backwards, it may be pinched between case halves.

To install the W04 Cable, reverse the preceding steps. Make sure you “snap” the connector retaining clips into the locked position.

For the next procedure, refer to **Summary of Replacement Procedures**.

W05 Power PCB/Smart Contact PCB Cable Replacement



To remove the W05 Cable (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning with step 2.
3. Complete the **A07 Smart Contact PCB Replacement** procedure, which disconnects the W05 Cable at A07 Smart Contact PCB-J42.
4. For orientation, locate A03 Power PCB-J12 on the **Inside Rear Case** drawing.
5. Compress the connector retaining clip and disconnect the W05 Cable at A03 Power PCB-J12. Remove the cable.

To install the W05 Cable, reverse the preceding steps.

For the next procedure, refer to **Summary of Replacement Procedures**.

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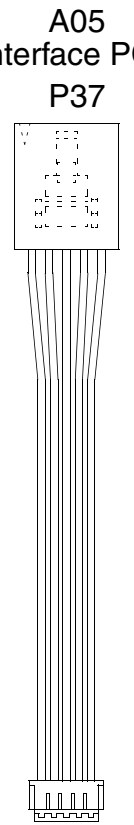
W06 Backlight PCB/Interface PCB Cable Replacement—LCD Devices



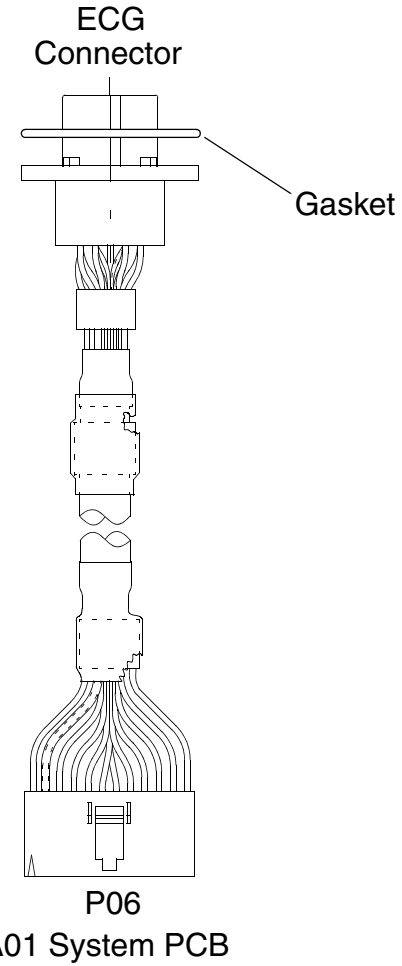
To remove the W06 Cable (front case):

1. Complete the **Case Disassembly** procedure.
2. For orientation, locate the W06 Cable on the **Inside Front Case** drawing.
3. Press the connector retaining clip and disconnect the W06 Cable at A05 Interface PCB-J37.
4. Place even pressure on the cable and ease the W06 Cable out of the connector at A08 Backlight-J49.

To install the W06 Cable, reverse the preceding steps.

For the next procedure, refer to **Summary of Replacement Procedures**.

W07 ECG Connector Cable Replacement



To remove the W07 ECG Connector Cable (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **Parameter Bezel Removal** procedure.
3. Remove the four screws (**230**) and washers (**336**) securing the W07 ECG Connector Cable. Remove the connector and gasket.

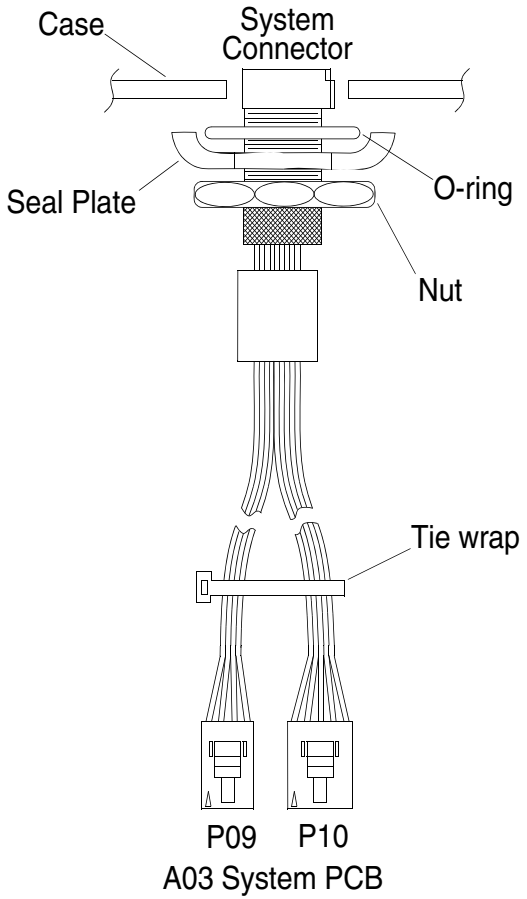
To install the W07 ECG Connector Cable, reverse the preceding steps, using a new gasket (**236**).

CAUTION!

Possible moisture leakage. When installing the W07 ECG Connector Cable, use a new gasket (236) to help prevent ingress of fluids.

For the next procedure, refer to **Summary of Replacement Procedures**.

W08 System Connector Cable Replacement



To remove the W08 System Connector Cable (rear case):

1. Complete the **Parameter Bezel Removal** procedure.
2. Remove the W08 System Connector Cable nut (**214**), connector seal plate (**220**), and O-ring seal (**240**). Remove the connector.

To install the W08 System Connector Cable, reverse the preceding steps. Observe the cable tie replacement when reinstalling the A03 Power PCB. Also note that the O-ring and the seal plate should slide over the connector threads separately.

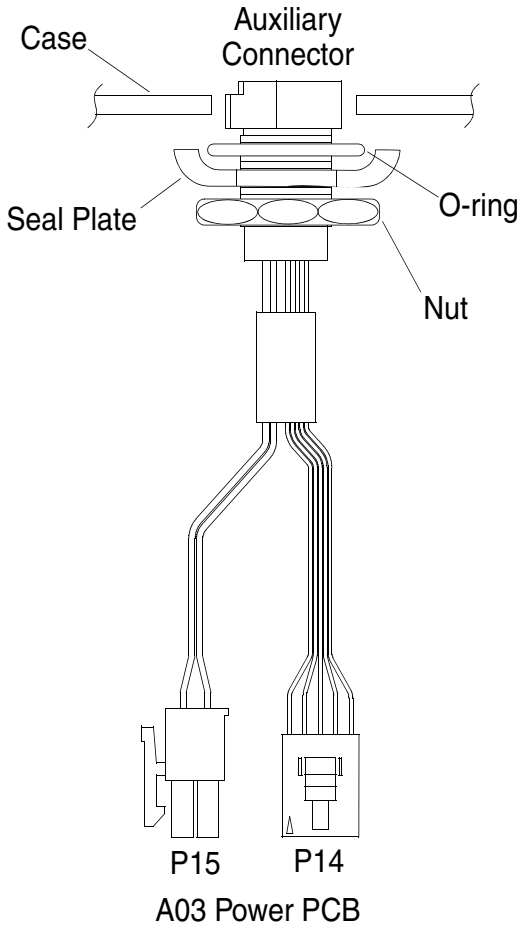
CAUTION!

Possible moisture leakage. When installing the W08 System Connector Cable, use a new O-ring (240) to help prevent ingress of fluids.

For the next procedure, refer to **Summary of Replacement Procedures**.

511

W09 Auxiliary Connector Cable Replacement



To remove the W09 Auxiliary Connector Cable (rear case):

1. Complete the **Parameter Bezel Removal** procedure.
2. Remove the W09 Auxiliary Connector Cable nut (**214**), connector seal plate (**220**), and O-ring seal (**240**). Remove the connector.

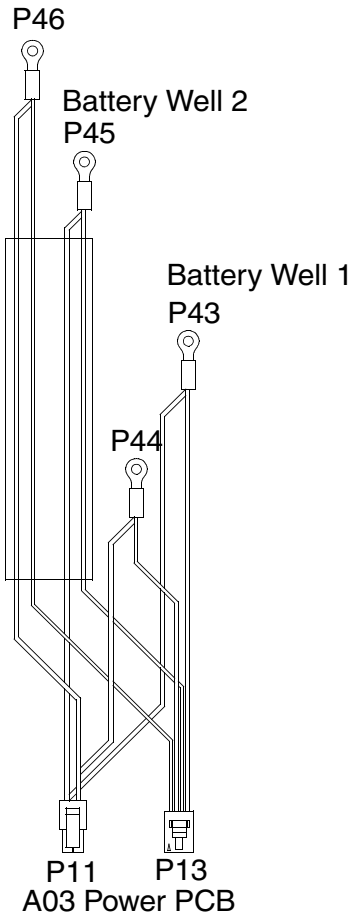
To install the W09 Auxiliary Connector Cable, reverse the preceding steps. Observe the cable tie replacement when reinstalling the A03 Power PCB. Also note that the O-ring and the seal plate should slide over the connector threads separately.

CAUTION!

Possible moisture leakage. When installing the W09 Auxiliary Connector Cable, use a new O-ring (240) to help prevent ingress of fluids.

For the next procedure, refer to **Summary of Replacement Procedures**.

W10 Battery Pins/Power PCB Cable Replacement—Monophasic Devices



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To remove the W10 Cable (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning with step 2.
3. Remove the **A06 OEM PCB** (if installed), **A13 Transfer Relay Assembly**, **A14 Waveshaping Inductor**, **A15 Energy Storage Capacitor**, and **W21 Cable**.
4. For orientation, locate the A03 Power PCB on the **Inside Rear Case** drawing.
5. Complete the **A21 NIBP/A23 CO2 Module Disassembly** procedure, steps 6 through 12.
6. Cut the cable tie securing the W10 Cable wiring to A03 Power PCB-J11 and A03 Power PCB-J13.
7. Depress the connector retaining clip and disconnect the W10 Cable at A03 Power PCB-J11 and also at A03 Power PCB-J13.

(Continued on next page)

W10 Battery Pins/Power PCB Cable Replacement—Monophasic Devices *(continued)*

8. Remove the four nuts (**216**) and lock washers to disconnect terminals P43 and P44 at Battery Well 1 and P45 and P46 at Battery Well 2. Note wire orientation for reinstalling the wires to the same studs. Remove the cable.

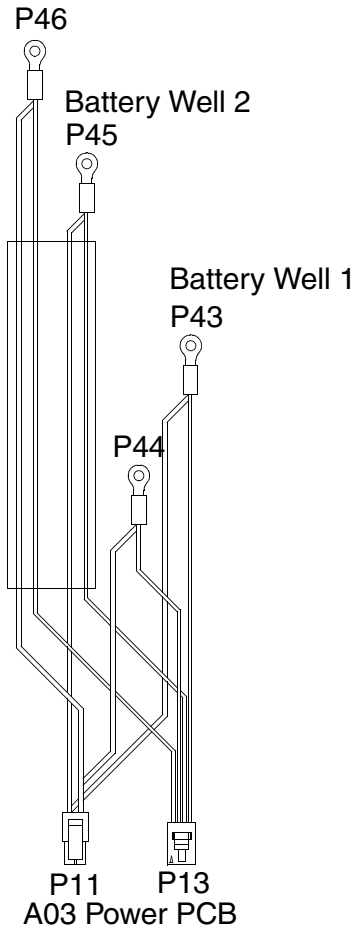
To install the W10 Cable, reverse the preceding steps. Observe the cable tie replacement when reinstalling the A03 Power PCB.

For the next procedure, refer to **Summary of Replacement Procedures**, or

Return to:

EMI Shield Replacement

W10 Battery Pins/Power PCB Cable Replacement—Biphasic Devices



515

To remove the W10 Cable (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning with step 2.
3. Complete the **A06 OEM PCB Replacement** procedure beginning with step 3.
4. Complete the **A15 Energy Storage Capacitor Replacement** procedure beginning with step 3.
5. Note the orientation of the P22 wiring for reinstallation, and then remove the A13 Transfer Relay Assembly.
6. For orientation, locate the A03 Power PCB on the **Inside Rear Case** drawing.
7. Complete the **A21 NIBP/A23 CO2 Module Disassembly** procedure, steps 6 through 12.
8. Cut the cable tie securing the W10 Cable wiring to A03 Power PCB-J11 and A03 Power PCB-J13.
9. Depress the connector retaining clip and disconnect the W10 Cable at A03 Power PCB-J11 and similarly at A03 Power PCB-J13.

(Continued on next page)

W10 Battery Pins/Power PCB Cable Replacement—Biphasic Devices *(continued)*

10. Remove the four nuts (**216**) and lock washers to disconnect terminals P43 and P44 at Battery Well 1 and P45 and P46 at Battery Well 2. Note wire orientation for reinstalling the wires to the same studs. Remove the cable.

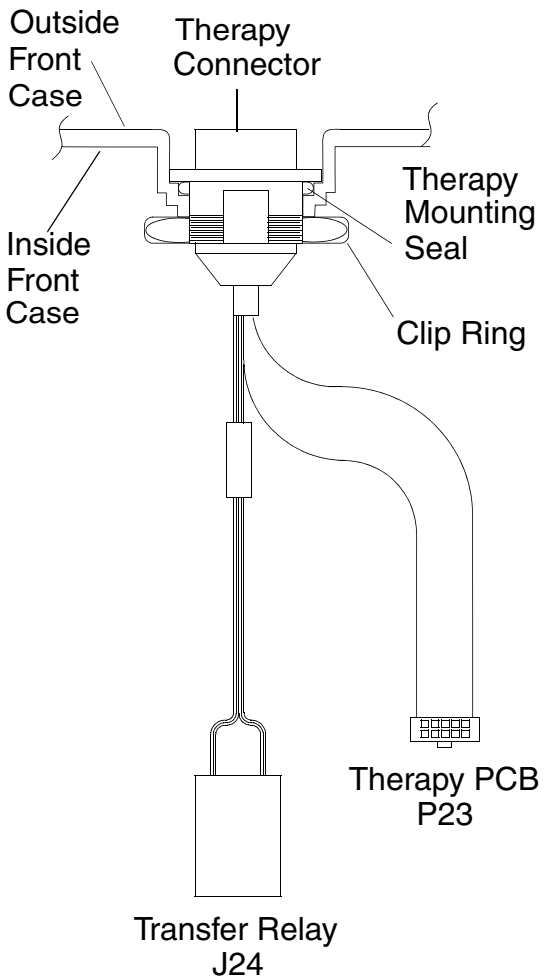
To install the W10 Cable, reverse the preceding steps. Observe the cable tie replacement when reinstalling the A03 Power PCB.

For the next procedure, refer to **Summary of Replacement Procedures**.

Return to:

EMI Shield Replacement

W11 Therapy Connector Cable Replacement



517

To remove the W11 Therapy Connector Cable (front case):

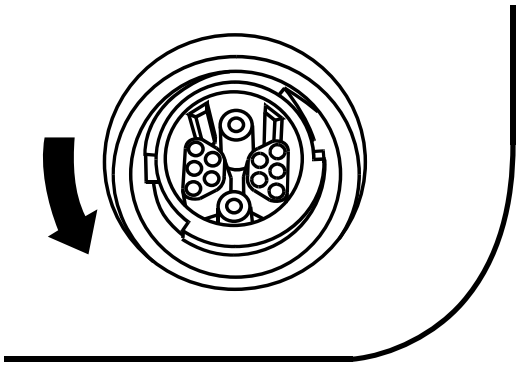
1. Complete the **Case Disassembly** procedure.
2. For orientation, locate the W11 Therapy Connector Cable on the **Inside Front Case** drawing.
3. From the inside of the front case, use a small flat-bladed screwdriver to pry the Clip Ring (**218**) away from the therapy connector at the flat portion connector. Set Clip Ring aside if front case replacement.
4. From the outside of the front case, remove W11 Therapy Connector Cable and Therapy Mounting Seal from the front case. Discard the Therapy Mounting Seal.

To install the W11 Therapy Connector Cable:

1. From the outside of the front case, install a new Therapy Mounting Seal (**238**) into the front case, with the smaller (outside diameter) side of the seal towards the front case.
2. From the outside of the front case, insert the new W11 Therapy Cable through the Therapy Mounting Seal and front case. Align the Therapy Connector tab with the notch in the front case. Apply even pressure to seat the Therapy Connector.

(Continued on next page)

W11 Therapy Connector Cable Replacement *(continued)*



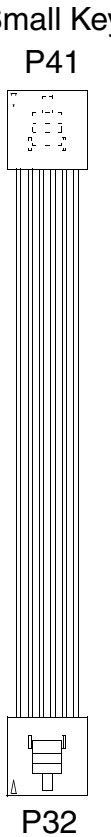
3. Release the Therapy Connector momentarily to allow pressure between front case and seal to relax, and then reapply pressure to the Therapy Connector.
4. From the inside of the front case, install the Clip Ring **(218)** onto the Therapy Connector.
5. To verify the new Therapy Connector is properly installed into the LIFEPAK 12, inspect the mounting seal visually for deformation between the seal and the front case. A properly installed seal is shown for reference.
6. Test the fit by attaching a Therapy Cable.The Therapy Cable locking feature must engage (rotate over) without assistance.

CAUTION!

Possible moisture leakage. When installing the Therapy Connector, use a new Therapy Mounting Seal (238) to help prevent ingress of fluids.

For the next procedure, refer to **Summary of Replacement Procedures**.

W12 Small Keypad/Interface PCB Cable Replacement



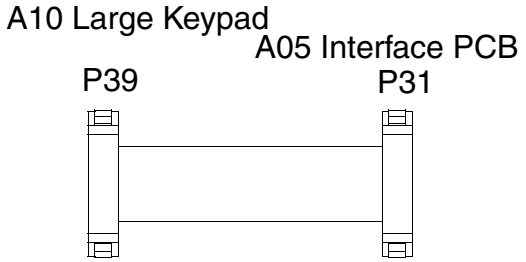
To remove the W12 Cable (front case):

1. Complete the **Case Disassembly** procedure.
2. For orientation, locate the W12 Cable on the **Inside Front Case** drawing.
3. Depress the connector retaining clip and disconnect the W12 Cable at A05 Interface PCB-J32.
4. Depress the connector retaining clip and disconnect the W12 Cable at A09 Small Keypad-J41.

To install the W12 Cable, reverse the preceding steps.

For the next procedure, refer to **Summary of Replacement Procedures**.

W13 Large Keypad/Interface PCB Cable Replacement



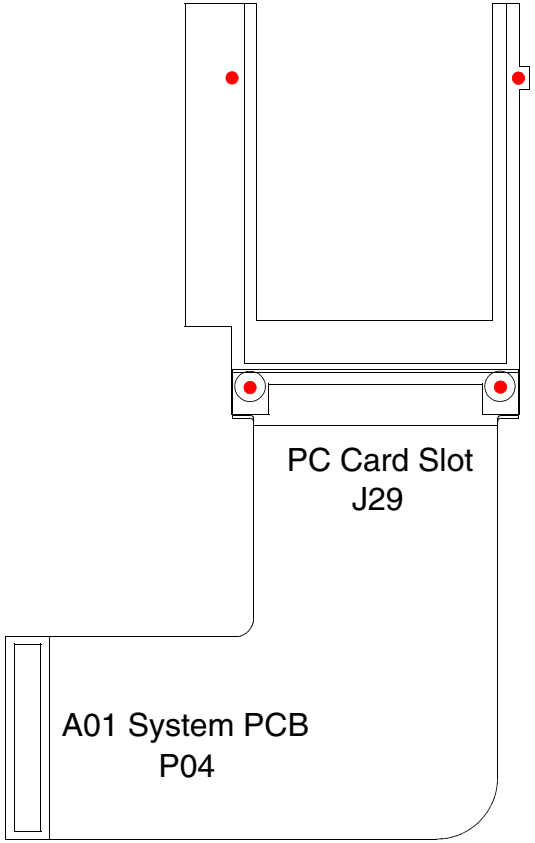
To remove the W13 Cable (front case):

1. Complete the **Case Disassembly** procedure.
2. For orientation, locate the W13 Cable on the **Inside Front Case** drawing.
3. Compress the connector retaining clips to unlock the connector and disconnect the W13 Cable at A05 Interface PCB-J31.
4. Compress the connector retaining clips to unlock the connector, and disconnect the W13 Cable at A10 Large Keypad-J39.

To install the W13 Cable, reverse the preceding steps. Make sure you “snap” the connector retaining clips into the locked position.

For the next procedure, refer to **Summary of Replacement Procedures**.

W14 System PCB/PC Card Slot Cable Replacement



To remove the W14 Cable (rear case):

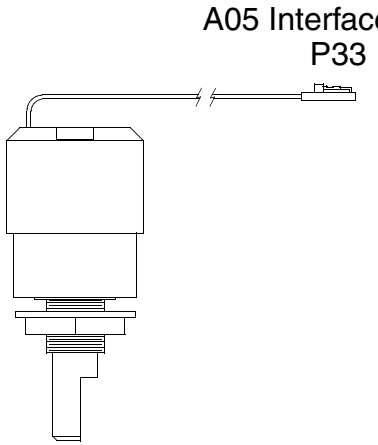
1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning with step 2.
3. Complete the **A06 OEM PCB Replacement** procedure beginning with step 3.
4. Complete the **A03 Power PCB Replacement** procedure beginning with step 4.
5. For orientation, locate the W14 Cable on the **Inside Rear Case** drawing.
6. Remove the four screws (**234**) securing J29 (PC Card slot connector) to the mounting bracket.

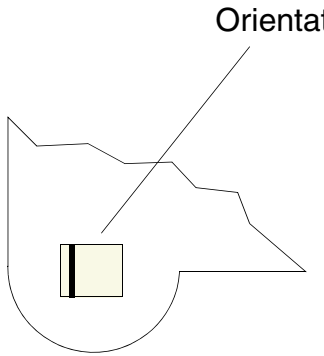
To install the W14 Cable, reverse the preceding steps.

Note: Do not overtighten screws. They may shear off.

For the next procedure, refer to **Summary of Replacement Procedures**.

W15 Selector Assembly Replacement





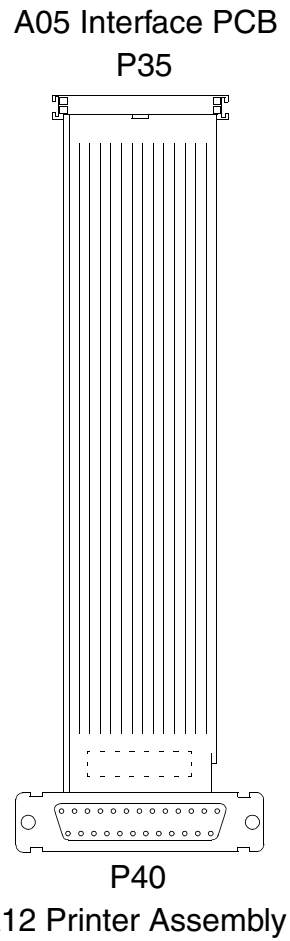
To remove the W15 Selector Assembly (front case):

1. Complete the **Case Disassembly** procedure.
2. For orientation, locate the W15 Selector Assembly on the **Inside Front Case** drawing.
3. Depress the connector retaining clip and disconnect the W15 Selector Assembly at A05 Interface PCB-J33.
4. From the outside of the front case, grasp the W15 Selector Assembly knob and, with steady smooth force, pull the knob off the W15 Selector Assembly shaft. Use a gripping tool if necessary, taking care to avoid any damage.
5. From the outside of the case, loosen and remove the nut and lock washer (part of the W15 Selector Assembly) from the W15 Selector Assembly shaft.
6. From the inside of the case, pull the W15 Selector Assembly away from the case and remove.

To install the W15 Selector Assembly, reverse the preceding steps. Tighten the securing nut.

For the next procedure, refer to **Summary of Replacement Procedures**.

W16 Printer Assembly/Interface PCB Cable Replacement



To remove the W16 Cable (front case):

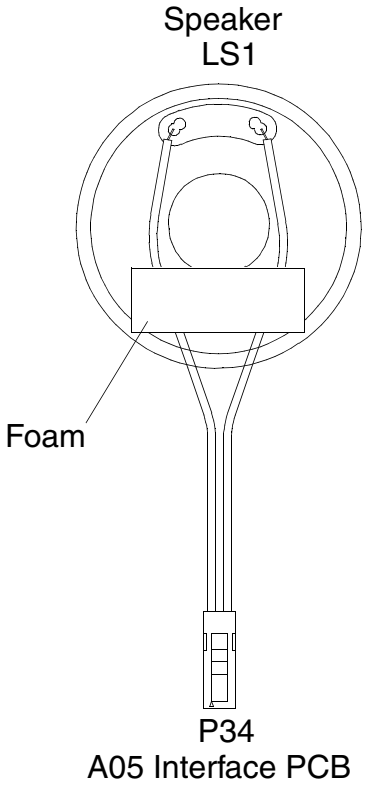
1. Complete the **Case Disassembly** procedure.
2. For orientation, locate the W16 Cable on the **Inside Front Case** drawing.
3. Spread the connector retaining clips and eject the W16 Cable at A05 Interface PCB-J35.
4. Disconnect the W19 Cable ground terminal from the A12 Printer Assembly connector bracket.
5. Remove the retaining screw (**230**) and connector bracket (**50**) on the A12 Printer Assembly housing that secures W16 Cable-P40.
6. With a flat edge, gently pry the W16 Cable-P40 out of the connector at A12 Printer Assembly-J40. Remove and discard the rubber moisture gasket (**204**).

To install the W16 Cable, reverse the preceding steps. Observe the following:

- Use a new rubber moisture gasket in reassembly (**204**).
- Reconnect the W19 Cable before installing the W16 Cable.

For the next procedure, refer to **Summary of Replacement Procedures**.

W17 Speaker Assembly Replacement



To remove the W17 Speaker Assembly (front case):

1. Complete the **Case Disassembly** procedure.
2. For orientation, locate the W17 Speaker Assembly on the **Inside Front Case** drawing.
3. Depress the connector retaining clip and disconnect the W17 Speaker Assembly at A05 Interface PCB-J34.
4. Remove the screw (**230**) securing the retaining spring (**246**) for the W17 Speaker Assembly. Note the orientation of the retaining spring for reassembly.

To install the W17 Speaker Assembly, reverse the preceding steps.

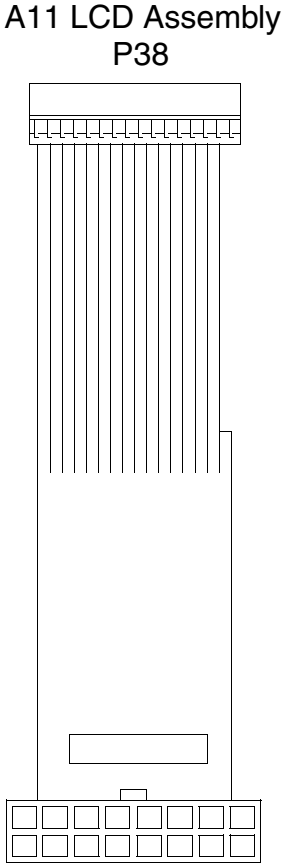
Note: Make sure you do not pinch the wires during reassembly.

CAUTION!

Possible moisture leakage. When installing the W17 Speaker Assembly, make sure the speaker felt moisture barrier (190) is in place to help prevent ingress of fluids. When replacing speaker, take care to not touch the speaker felt.

For the next procedure, refer to **Summary of Replacement Procedures**.

W18 LCD Assembly/Interface PCB Cable Replacement—LCD Devices



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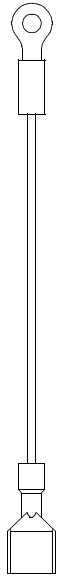
To remove the W18 Cable (front case):

1. Complete the **Case Disassembly** procedure.
2. For orientation, locate the W18 Cable on the **Inside Front Case** drawing.
3. Spread the connector retaining clips and eject the W18 Cable at A05 Interface PCB-J36.
4. Place even pressure on the cable ribbon and ease the W18 Cable out of the edge connector at A11 LCD Assembly-J38.

To install the W18 Cable, reverse the preceding steps.

For the next procedure, refer to **Summary of Replacement Procedures**.

W19 Printer Assembly/Chassis Ground Cable Replacement



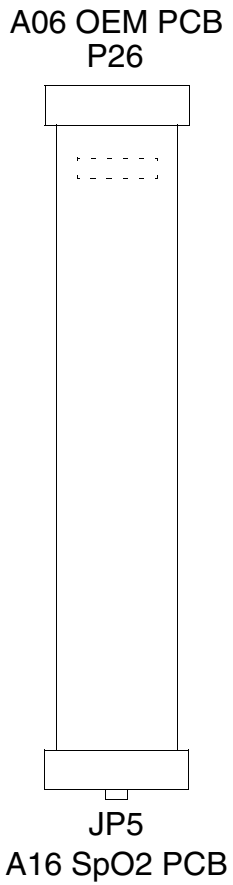
To remove the W19 Cable (front case):

1. Complete the **Case Disassembly** procedure.
2. For orientation, locate the W19 Cable on the **Inside Front Case** drawing.
   a. LCD Assembly only: Remove the screw (**230**) securing the W19 Cable to the A11 LCD Assembly Bracket (**42**).
   b. EL Display only: Remove the screw (**230**) securing the W19 Cable to the A11 EL Display Assembly Bracket (**42**).
3. Disconnect the W19 Cable ground terminal from the A12 Printer Assembly connector bracket.

To install the W19 Cable, reverse the preceding steps.

For the next procedure, refer to **Summary of Replacement Procedures**.

W21 OEM PCB/SpO2 Module Cable Replacement, Nellcor



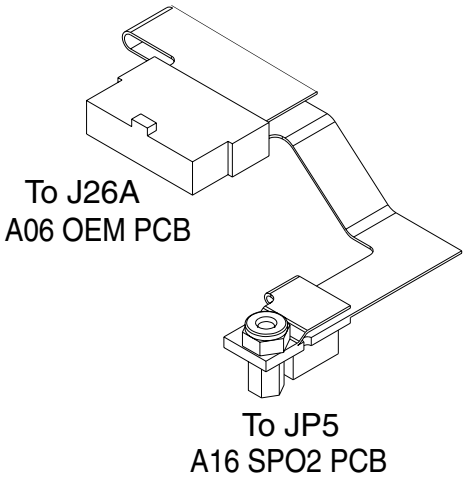
To remove the W21 Cable (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning with step 2.
3. For orientation, locate A06 OEM PCB-J26 on the **Inside Rear Case** drawing.
4. Spread the connector retaining clips and eject the W21 Cable from A06 OEM PCB-J26A.
5. Remove the metal retaining clip (**228**), and disconnect the W21 Cable at A16 SpO2 Module-JP5.

To install the W21 Cable, reverse the preceding steps.

For the next procedure, refer to **Summary of Replacement Procedures**.

W21 OEM PCB/SpO2 Module Cable Replacement, Masimo



To remove the W21 Cable (rear case):

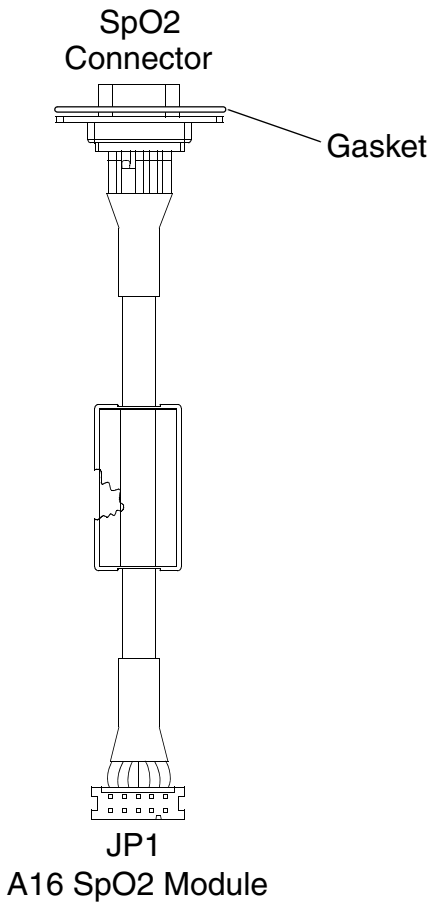
1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning with step 2.
3. Locate A06 OEM PCB-J26 and A16 SPO2 PCB on the **Inside Rear Case** drawing.
4. Remove the upper foam **(22)** and pass the **A16** SpO2 PCB back through the hole in the foam. Turn the A16 PCB over and remove the screw **(414)** holding the W21 cable to the JP5 connector.
5. Disconnect the W21 Cable at A16 SpO2 Module-JP5. The A16 PCB will still be connected to the system by the W22 SPO2 cable. Set the A16 PCB aside.
6. Remove the retaining clip (**228**) holding W21 to J26A on the A06 OEM PCB. Disconnect P26 of the W21 Cable from A06 OEM PCB-J26A.

To install the W21 Cable, reverse the receding steps.

Note: Apply 4 in lbs of torque when reinstalling the screw retaining W21 to JP5 on the A16 SPO2 PCB.

For the next procedure, refer to **Summary of Replacement Procedures**.

W22 SpO2 Connector Cable Replacement, Nellcor



To remove the W22 SpO2 Connector Cable (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **Parameter Bezel Removal** procedure beginning with step 2.
3. Remove the two screws (**234**) securing the W22 SpO2 Connector Cable. Remove the connector and gasket (**206**).

To install the W22 SpO2 Connector Cable, reverse the receding steps, using a new gasket (**206**).

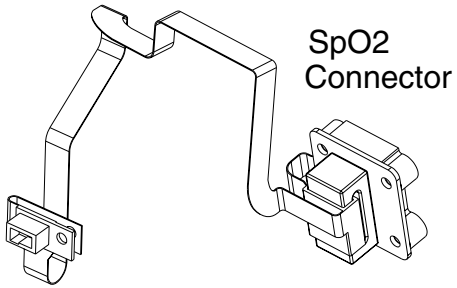
Note: Place the connector screws through the connector and seal, and then attach to the parameter bezel.

CAUTION!

Possible moisture leakage. When installing the SpO2 cable, use a new gasket (206) to help prevent ingress of fluids. Apply 2 in lbs of torque when reinstalling the screw retaining W22.

For the next procedure, refer to **Summary of Replacement Procedures**.

W22 SpO2 Connector Cable Replacement, Masimo



JP1
A16 SpO2 Module

To remove the W22 SpO2 Connector Cable (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **Parameter Bezel Removal** procedure beginning with step 2.
3. Remove the four screws (**234**) securing the W22 SpO2 Connector Cable. Remove the connector from the parameter bezel.

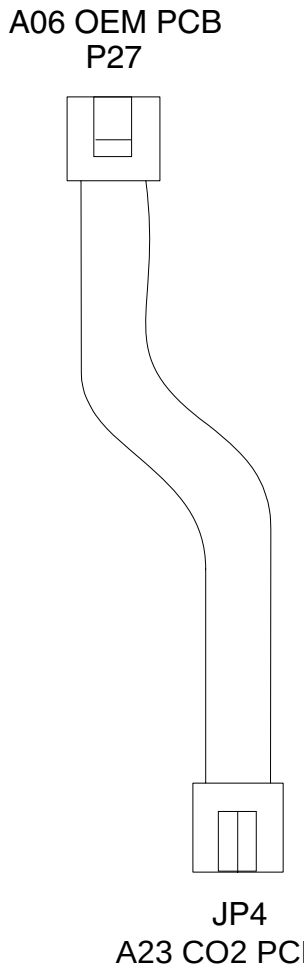
To install the W22 SpO2 Connector Cable, reverse the receding steps.

CAUTION!

Possible moisture leakage. When installing the SpO2 cable, Apply 2 in lbs of torque when reinstalling the screw retaining W22 to help prevent ingress of fluids.

For the next procedure, refer to **Summary of Replacement Procedures**.

W26 OEM PCB/CO2 PCB Cable Replacement



To remove the W26 Cable (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning with step 2.
3. Complete the **A06 OEM PCB Replacement** procedure beginning with step 3. (The W26 Cable will now be disconnected from the A06 OEM PCB.)
4. Complete the **A21 NIBP/A23 CO2 Module Disassembly** procedure beginning with step 4.
5. Disconnect the W26 Cable from A23 CO2 PCB-J4.

To install the W26 Cable, reverse the receding steps.

For the next procedure, refer to **Summary of Replacement Procedures**.

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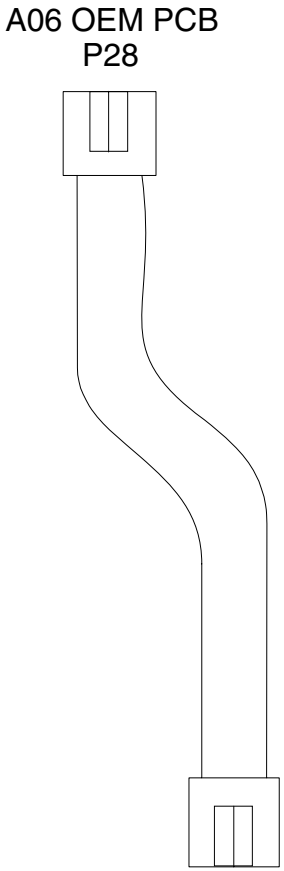
W27 OEM PCB/NIBP PCB Cable Replacement



To remove the W27 Cable (rear case):

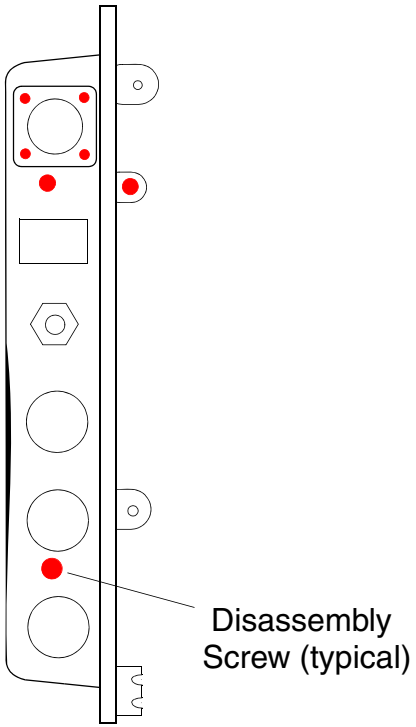
1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning with step 2.
3. Complete the **A06 OEM PCB Replacement** procedure beginning with step 3. (The W27 Cable will now be disconnected from the A06 OEM PCB.)
4. Complete the **A21 NIBP/A23 CO2 Module Disassembly** procedure beginning with step 4.
5. Disconnect the W27 Cable from A21 NIBP PCB-J2.

To install the W27 Cable, reverse the receding steps.

For the next procedure, refer to **Summary of Replacement Procedures**.

532

W28 CO2 Connector Removal



To remove the W28 CO2 Connector (parameter bezel):

Note: If the A23 CO2 PCB has already been removed, skip steps 1 through 3. The Parameter Bezel Removal (step 4) will be partially completed.

Note: These steps include the A06 OEM PCB and all options on the Parameter Bezel. Your device may not have some of these options.

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning with step 2.
3. Complete the **A06 OEM PCB Replacement** beginning with step 3.
4. Complete the **Parameter Bezel Removal** beginning with step 2.
5. Remove the four screws (**376**) securing the CO2 Connector Adapter (**354**) to the parameter bezel. Remove the CO2 Connector Adapter and, from the underside of the bezel, remove the CO2 Connector Retainer (**358**) and Seal (**360**).

(Continued on next page)

W28 CO2 Connector Removal *(continued)*

To install the new W28 CO2 Connector, reverse the steps on the previous page and observe the following:

1. Set the CO2 Connector Adapter (**354**) in place on the face of the new bezel, and the CO2 Connector Retainer (**358**) and Seal (**360**) in place on the underside of the bezel, and screw together with four screws (**376**).

   Note: The CO2 Connector Adapter should have a magnet glued in place on its underside.

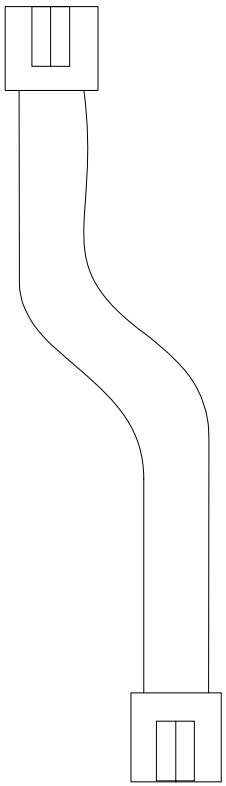
2. Apply the Parameter Bezel Label (**158**) to the new bezel front.
3. Install CO2 Connector Cover (**356**) onto the Adapter.

CAUTION!

Possible moisture leakage. When installing the SpO2 connector, apply 2inlbs of torque when reinstalling the screw retaining W28 to help prevent ingress of fluids.

For the next procedure, refer to **Summary of Replacement Procedures**.

W30 CO2 PCB Adapter Cable Replacement



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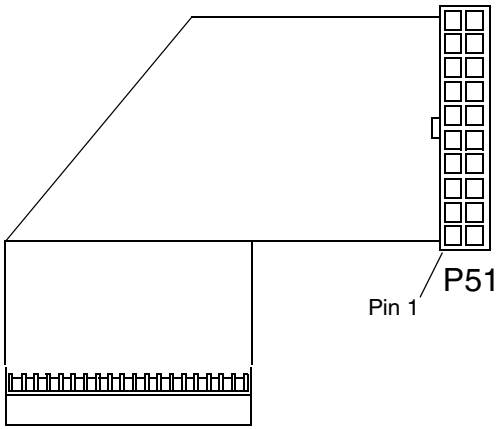
To remove the W30 Adapter Cable (rear case):

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning with step 2.
3. Complete the **A06 OEM PCB Replacement** procedure beginning with step 3. (The W30 Adapter Cable will now be disconnected from the W28 CO2 Connector cable.)
4. Complete the **A21 NIBP/A23 CO2 Module Disassembly** procedure beginning with step 4.
5. Note the position of the ferrite bead and wire routing, and then disconnect the W30 Cable from A23 CO2 PCB-J1.

To install the W30 Adapter Cable, reverse the preceding steps.

For the next procedure, refer to **Summary of Replacement Procedures**.

W32 EL Assembly/Interface PCB Cable Replacement



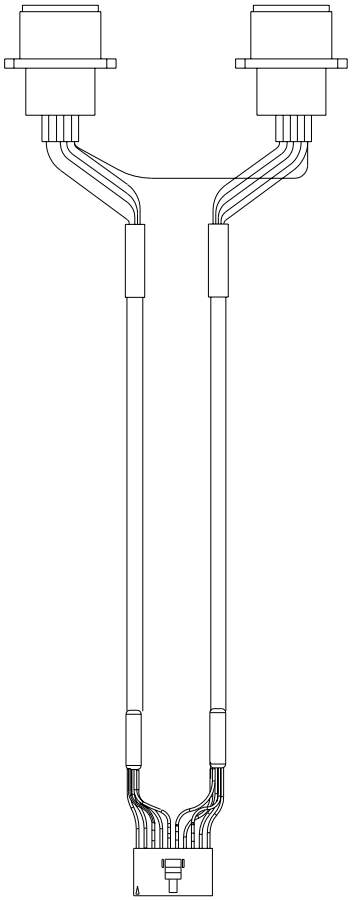
To remove the W32 Cable (front case):

1. Complete the **Case Disassembly** procedure.
2. For orientation, locate the W32 Cable on the **Inside Front Case** drawing.
3. Press the connector retaining clip and disconnect the W32 Cable at A05 Interface PCB-J51.
4. Press the connector retaining clip and disconnect the W32 Cable at A11 EL Display connector.

To install the W32 Cable, reverse the receding steps.

For the next procedure, refer to **Summary of Replacement Procedures**.

W33 Invasive Pressure Connector Assembly Removal



To Remove the Invasive Pressure Connector Assembly:

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning with step 2.
3. Complete the **A06 OEM PCB Replacement** procedure beginning with step 3.
4. Complete the **Parameter Bezel Removal** procedure beginning with step 2.
5. Remove the 8 screws **(230)** and washers **(336)** securing the IP Connectors to the parameter bezel. Remove the IP Connectors and Seals **(406)**.
6. Disconnect the IP Connector Cable from the A01 System PCB J7 connector.

To install the W33 Invasive Pressure Connector Assembly, reverse the receding steps.

CAUTION!

Possible moisture leakage. When installing the cable, use new gaskets (406) to help prevent ingress of fluids.

For the next procedure, refer to **Summary of Replacement Procedures**.

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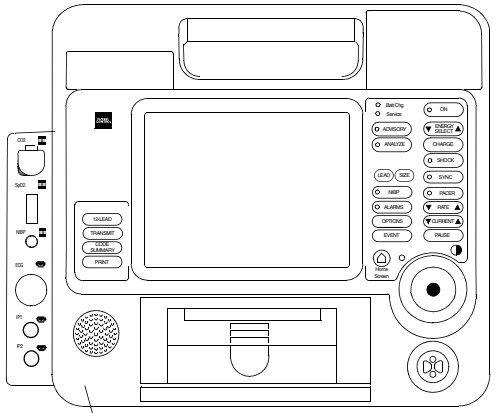
Front Case Replacement

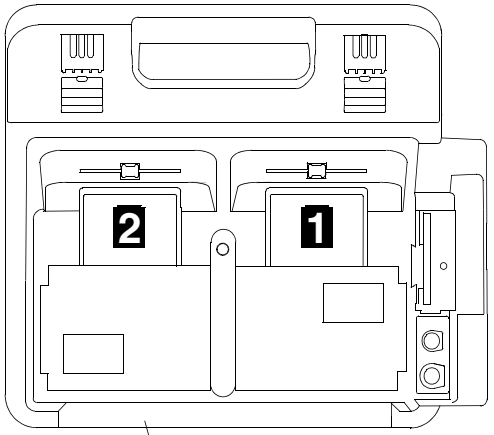


To remove the front case:

1. Remove the **A12 Printer Assembly**.
2. Complete the **Case Disassembly** procedure.
3. To identify components, see the **Inside Front Case** drawing.
4. Remove the **A05 Interface PCB**, **A09 Small Keypad**, and **A10 Large Keypad**. In reinstallation, use new keypads. (Make sure the date code on the new keypads has not expired.)
5. Device with LCD Assembly only: Conduct the **Front Case Metal Shield Disassembly** procedure (which also removes the A08 Backlight PCB).
6. Remove the **A11 LCD Assembly** or the **A11 EL Display Assembly**, the **W15 Selector Assembly**, **W17 Speaker Assembly**, and **W11 Therapy Connector Cable**.
7. Remove the **W16 Cable**, **W19 Cable**.
8. Remove the **Front Case Lens**. In reassembly, use a new lens.
9. Transfer the screw (**230**), printer bracket (**50**), and gasket (**204**) to the new front case.

To install the front case, reverse the receding steps.

Rear Case Replacement—Monophasic Devices



Rear Case

To remove the rear case:

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning with step 2.
3. Complete the **A06 OEM PCB Replacement** procedure, beginning with step 3, if installed.
4. Complete the **Parameter Bezel Removal** procedure, beginning with step 4, to remove the bezel, the modem and power PCBs, and all the option connectors.
5. Complete the **A21 NIBP / A23 CO2 Module Disassembly** procedure, beginning with step 4, to remove optional A16 SpO2, A21 NIBP, A23 CO2 PCBs, if installed.
6. Complete steps 5 through 8 of the **A13 Transfer Relay Assembly Replacement** procedure.
7. Complete steps 5 through 8 of the **A14 Waveshaping Inductor Replacement** procedure.
8. Complete steps 7 and 8 of the **A15 Energy Storage Capacitor Replacement** procedure (includes A17 Interconnect Bracket).
9. Remove the **A07 Smart Contact PCB**.

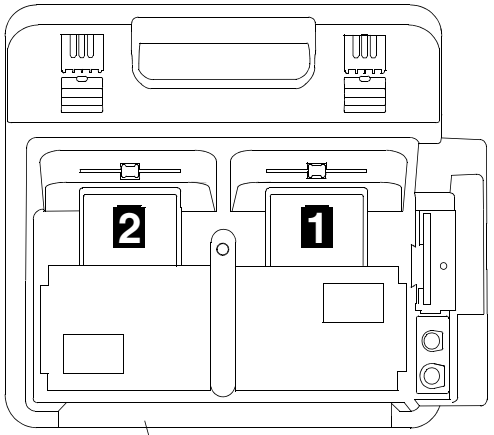
(Continued on next page)

Rear Case Replacement—Monophasic Devices *(continued)*

10. Remove the **W08 System Connector Cable**, **W09 Auxiliary Connector Cable**, **W10 Cable** (including the battery pins), and **W14 Cable**.
11. Transfer the following from the old rear case to the new rear case:
    - Drain seal (**16**)
    - EMI shield (**150**)

To install the rear case, reverse the receding steps.

Rear Case Replacement—Biphasic Devices



Rear Case

To remove the rear case:

1. Complete the **Case Disassembly** procedure.
2. Complete the **System/Memory/Therapy PCB Disassembly** procedure beginning with step 2.
3. Complete the **A06 OEM PCB Replacement** procedure (if installed) beginning with step 3.
4. Complete the **Parameter Bezel Removal** procedure, beginning with step 4, to remove the bezel, the modem and power PCBs, and all the option connectors.
5. Complete the **A21 NIBP/A23 CO2 Module Disassembly** procedure, beginning with step 4, to remove optional A16 SpO2, A21 NIBP, A23 CO2 PCBs, if installed.
6. Complete steps 5 through 10 of the **A13 Transfer Relay Assembly Replacement** procedure.
7. Observing orientation, cut the large tie wrap (**224**) securing the A15 Energy Storage Capacitor and A17 Interconnect Bracket to the rear case. Remove A15 and A17.
8. Remove the **A07 Smart Contact PCB**.

(Continued on next page)

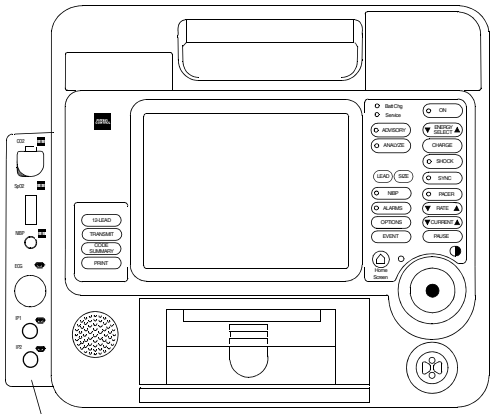
Rear Case Replacement—Biphasic Devices *(continued)*

9. Remove the **W08 System Connector Cable**, **W09 Auxiliary Connector Cable**, or **W10 Cable—Biphasic** (including the battery pins), and **W14 Cable**.

Note: For units using the later EMI shield design, the EMI shield ((**150**) is part of the rear case. The foam strips to support the CO2 module are built into the later EMI shield.

To install the rear case, reverse the receding steps.

Parameter Bezel Replacement



Parameter Bezel

To remove the Parameter Bezel (rear case):

1. Complete the **Parameter Bezel Removal** procedure.
2. Transfer the following items from the old Parameter Bezel to the new Parameter Bezel as they apply to your device:
   - **W07 ECG Connector Cable** and seal.
   - **W22 SpO2 Connector Cable** and seal.
   - **W33 Invasive Pressure Connectors** and seals.
3. Transfer the NIBP Connector to the new Parameter Bezel as follows:
   a. Remove the NIBP tube (**378**) from the NIBP Connector (**346**).

      Note: If the NIBP tube has been previously disconnected/reconnected from the fitting one or more times, the tube end should be trimmed to maintain an airtight seal.

   b. Remove the fitting nut on the back side of the bezel to remove the connector (**346**) and seal (**348**).
   c. Repeat the steps in reverse order to install the connector to the parameter bezel.

(Continued on next page)

Parameter Bezel Replacement *(continued)*

4. Transfer the **W28 CO2 Connector Assembly** to the new Parameter Bezel as follows:

   Note: The CO2 Connector Adapter (**354**) should have a magnet glued in place on its underside.

   a. Set CO2 Connector Adapter (**354**) in place on the face of the new bezel, and the CO2 Connector Retainer (**358**) and Seal (**360**) in place on the underside of the bezel, and screw together with four (**376**) screws.

   b. Apply the Parameter Bezel Label (**158**) to the new bezel front.

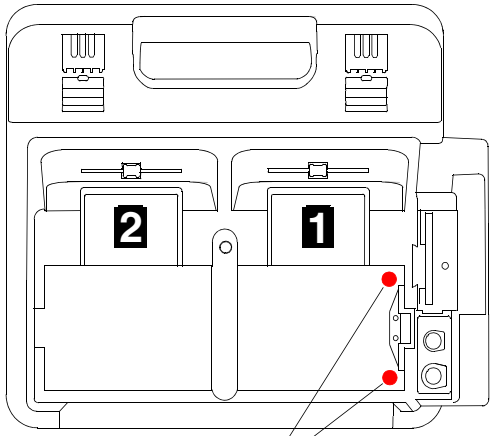
   c. Install the CO2 Connector Cover (**356**) onto the Adapter.

   d. Close the CO2 Connector Cover.

5. To install the new Parameter Bezel, reverse the steps in **Parameter Bezel Removal**.

For the next procedure, refer to **Summary of Replacement Procedures**.

Battery Pin Replacement



Battery Pins
(typical)

Inspect the battery connector pins as part of the routine physical inspection. Be sure to examine each leaf on the pins to ensure that they are not cracked or broken. Tighten any pins that are loose. Replace any pins that are bent, broken, corroded, worn, or damaged. Battery pins are replaced from outside the case.

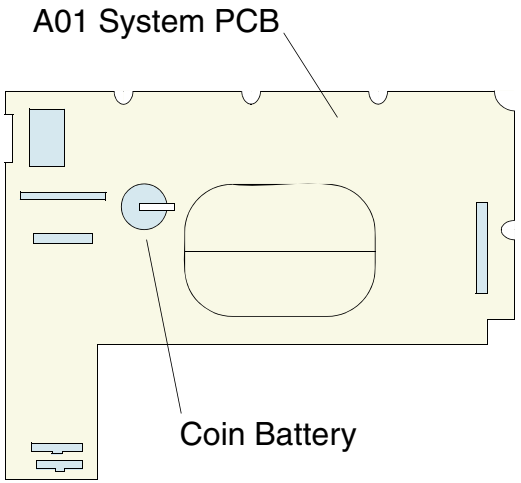
To replace a battery pin:

1. Using a 5/32-inch nut driver, unscrew the pin and remove.
2. Hand-thread the new battery pin (**186**) into position and then tighten firmly, but do not overtighten.

The battery pins are replaced every 2 years as part of the **Scheduled Replacement Items** list.

Note: The battery grommets are not replaceable. Complete the **Rear Case Replacement Procedure** to repair damaged battery grommets.

Coin Battery Replacement



CAUTION!

Possible loss of device configuration. The coin battery powers the device real-time clock and a 32kx8 NVRAM memory device that stores the device configuration data, calibration data, and other important data. A depleted or removed battery will cause loss of calibration, Serial Number, Date of MFG, Time and Date. Call your service technician for assistance when battery replacement is required.

To replace the coin battery on the A01 System PCB (rear case):

1. Complete the **Case Disassembly** procedure.
2. Locate the coin battery in the adjacent drawing or, for orientation, see the **Inside Rear Case** drawing.
3. With the new coin battery, MIN 202305-000 (type CR2032), at hand, lift the coin battery hold-down spring just enough to slide the old battery out of the holder base, and then slide in the new battery, (+) terminal up.
4. Reentry of device data and calibration values will be required if 3 volts are not maintained across coin battery holder during replacement.
5. The coin battery should by replaced every 5 years as part of the **Scheduled Replacement Items** list. To verify the device configuration has not been lost, refer to **Verifying the Device Configuration**.

For the next procedure, refer to **Summary of Replacement Procedures** or continue to the **Case Reassembly** procedure.

Software Replacement and Device Upgrades

The LIFEPAK 12 defibrillator/monitor software replacement and device upgrade procedures require specialized training and entail information proprietary to Medtronic. These procedures may be performed only by authorized Medtronic personnel.

Contact your local Medtronic representative for assistance.

Verifying the Device Configuration Data

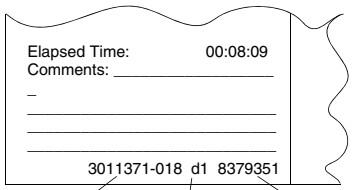
CAUTION!

Possible inoperable device. The configuration data is critical for proper operation of the device. If the device configuration data is lost, the device CAN NOT BE USED. Contact factory support if you lose this data.

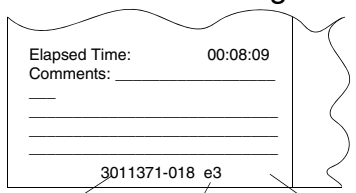
The device configuration data consists of the manufacturing code, device profile (options, features), serial number, calibration data, and user setup configuration. This data is stored on a 32-kilobyte memory device that is powered by a coin battery located on the A01 System PCB. If this coin battery is improperly replaced or is dead, then the device configuration data will be lost.

To check if your device has lost the configuration data information, turn on the device and press the CODE SUMMARY control. A device that has lost configuration data will not display a serial number on the Code Summary printout and may also list an incorrect Device Profile (see below).

Device with correct configuration data



Device with incorrect configuration data



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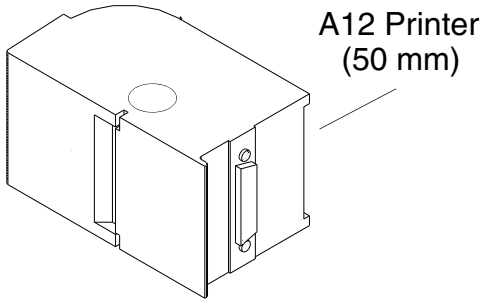
Verifying the Device Configuration Data *(continued)*

The LIFEPAK 12 defibrillator/monitor device configuration data may be loaded only by authorized Medtronic personnel. Contact your local Medtronic representative for assistance.

A12 Printer (50 mm) Repair Procedures



This section provides instructions for repairing the A12 Printer (50 mm). Also refer to the **A12 Printer (50 mm) Assembly Drawing** and the **A12 Printer (50 mm) Parts List** to locate parts specified in these procedures.

Only the parts available for replacement are listed. Other parts are shown for reference only.

To remove the A12 Printer (50 mm) from the front case, refer to the **A12 Printer Assembly (50 mm) Replacement** procedure.

Removing the Motor Assembly

To remove the Motor Assembly:

1. Using a knife blade or small slotted screw driver, pry out and remove the gear cover (**903**).
2. Remove the retaining ring (**910**) and the 31-tooth idler motor gear (**906**). Discard the retaining ring.
3. Remove the three flathead motor mounting screws (part of **907**).
4. Push out and remove the motor (**907**) from the recorder chassis.
5. Pull off the motor connector tubing and remove the connector.

For the next procedure, refer to **Summary of Replacement Procedures**.

(Continued on next page)

A12 Printer (50 mm) Repair Procedures *(continued)*

Installing the Motor Assembly

To install the motor assembly:

1. Plug the motor connector into the mating connector on the recorder chassis with the black wire facing toward the chassis bottom.

   Note: Do not reverse the black and red leads. This will cause the recorder to run backwards.

2. Slide the motor leads tubing fully over the connector and latch. (It may be necessary to expand the tubing with pliers before installing.) Make sure that the motor connector end is latched.
3. Install the gear end of the motor (**907**) into the chassis gear hole and align the mounting holes.
4. Rotate and position the motor so that the motor leads are against the chassis center wall.
5. Install the three flathead motor mounting screws (part of **907**). Do not over-tighten.
6. Install the 31-tooth motor gear (**906**) and retaining ring (**910**). Make sure the recessed side of the gear faces out.
7. Remove the adhesive release liner on the gear cover. Install the gear cover into the recessed gear area of the recorder chassis.

(Continued on next page)

A12 Printer (50 mm) Repair Procedures *(continued)*

Removing the Door Assembly

To remove the Door Assembly:

1. Open the door (**904**) until the door-open spring bushing (**912**) is exposed.
2. Using a screwdriver, snap out the spring bushing from the door side.
3. Deflect out the door sides over the hubs and remove the door and spring.

Installing the Door Assembly

To install the Door Assembly:

1. Insert the long leg of the door-open spring as far as possible into the hole located on the side of the recorder chassis.
2. Place the loop of the spring (**912**) over the hub on the side of the recorder chassis.
3. Flex the spring and hook the spring bushing over the edge of the chassis.
4. Place the door assembly (**904**) over the end of the recorder chassis and push until the door sides snap into place over the hubs on both sides of the recorder chassis. Make sure that the paper ejector is positioned inside the recorder chassis.
5. Using a screwdriver, push the spring bushing into the hole located inside the door side wall. Make sure that the bushing is fully seated.

(Continued on next page)

A12 Printer (50 mm) Repair Procedures *(continued)*

Removing the Printroller Assembly

To remove the printroller assembly:

1. Deflect out the door flange adjacent to the printroller gear, and remove the printroller (**909**), paper strippers (**913**), and shaft (**911**).
2. Save the paper strippers and roller shaft for reassembly.

Installing the Printroller Assembly

To install the printroller:

1. Place the roller shaft (**911**) into the printroller assembly (**909**) with the flat end opposite the printroller gear.
2. Align and position the flat end of the roller shaft, with the installed printroller, into the door D-shaped hole.
3. Snap the other end of the shaft into the door hole on the gear side of the assembly. Make sure the roller assembly and gears will rotate freely.
4. Bend and rotate the paper strippers (**913**) into place. Make sure the paper strippers fit loosely in the printroller slots. Remove and replace the printroller assembly if the paper strippers do not fit loosely.

A12 Printer (100 mm) Repair Procedures

This section provides instructions for repairing the A12 Printer (100 mm). Also refer to the **A12 Printer (100 mm) Parts List** to locate parts specified in these procedures.

Only the parts available for replacement are listed. Other parts are shown for reference only.

To remove the A12 Printer (100 mm) from the front case, refer to the **A12 Printer Assembly (100 mm) Replacement Procedure**.

Removing the Paper Cradle

Removal and installation of the paper cradle may be accomplished without removing the printer assembly from the LIFEPAK 12 defibrillator/monitor.

To remove the paper cradle (if necessary):

1. Open the recorder door.
2. Grasp the front portion of the cradle and bend it up slightly to disengage one of the front pivot pins from its hole in the printer door. With one of the front pivot pins disengaged, the other front pivot pin may be removed from its hole.
3. Tilt the paper cradle to disengage the rear pivot pins from their “S” slots.
4. Lift the cradle out of the printer.

(Continued on next page)

A12 Printer (100 mm) Repair Procedures *(continued)*

Installing the Paper Cradle

To install the new paper cradle:

1. Position the new cradle with the long pair of pivot pins toward the inside (or rear) of the printer.
2. Slip one of the long pins (on either side) into its “S” slot. Twist or tilt the cradle slightly to engage the other long pin.
3. Lift the printer door slightly. **GENTLY** lift and bend the front of the cradle in order to seat the two shorter (front) pivot pins, one at a time.

CAUTION!

Possible Product Damage. Excessive bending may break the paper cradle or loosen the clear plastic guard.

Removing the Motor/ Gear Assembly

To Remove the Motor/Gear Assembly:

1. Remove the printer assembly from the LIFEPAK 12 defibrillator/monitor (refer to **A12 Printer Assembly (100 mm) Replacement** procedure).
2. Locate the connector on the red/black wire harness from the motor/gear assembly.
3. Slide the connector out from under the retaining clip, and unplug the harness from the flexible circuit.

(Continued on next page)

A12 Printer (100 mm) Repair Procedures *(continued)*

Removing the Motor/ Gear Assembly (continued)

CAUTION!

Possible Product Damage. Be careful not to damage the flex during this operation.

4. Remove the single screw and thin washer that retains the large gear at the end of the recorder assembly. Slide the large gear off and set it aside.
5. Note the orientation of the red/black wire harness as it exits the motor.
6. Remove the three small Phillips head screws that secure the motor/gear assembly. Remove the motor/gear assembly.

Installing the Motor/ Gear Assembly

To install the new motor/gear assembly:

1. Position the new motor/gear assembly with the gear protruding through the access hole.

   Note: The side of the motor where the red/black wire harness exits must face the body of the printer.

2. Install the three small Phillips head screws that secure the motor/gear assembly.
3. Reconnect the red/black wire harness to the flexible circuit, and position the connector beneath the retainer clip, between the molded ribs.

(Continued on next page)

A12 Printer (100 mm) Repair Procedures *(continued)*

Installing the Motor/ Gear Assembly (continued)

4. Set the large gear back in place, with the shoulder side of the gear facing the printer. Make sure that it meshes with the two small gears (on the motor and the drive roller). Reinstall the retaining screw and thin washer to secure the large gear.

Removing the Door/ Roller Assembly

To remove the Printer Door/Roller:

1. Remove the printer assembly from the LIFEPAK 12 defibrillator/monitor (refer to **A12 Printer Assembly (100 mm) Replacement** procedure).
2. Open the printer door (after the printer assembly has been removed).
3. Remove the paper cradle (refer to **Paper Cradle Installation** procedure).
4. Hold the printer assembly in the left hand, or place on the work surface with the label side of the printer down.
5. **GENTLY** press inward on the bottom of the right-hand printer flange to release the right side printer door pivot pin.

CAUTION!

Possible Product Damage. Excessive pressure applied to the printer flange may deform or break the printer chassis, necessitating replacement of the printer assembly.

(Continued on next page)

A12 Printer (100 mm) Repair Procedures *(continued)*

Removing the Door/ Roller Assembly (continued)

6. Disengage the pivot pin at the other side of the printer door, and pull out on the door to remove.

Installing the Door/ Roller Assembly

Install the new door/roller assembly as follows:

1. Engage the pivot pin on the left side of the printer door.
2. **GENTLY** press inward on the flange at the right side of the printer, and slip the right pivot pin on the printer door into place.

CAUTION!

Possible Product Damage. Excessive pressure applied to the printer flange may deform or break the printer chassis, necessitating replacement of the printer assembly.

3. Reinstall the paper cradle (refer to **Paper Cradle Installation** procedure).

LIFEPAK 12 Voice Recorder Installation/Removal

Installing the LIFEPAK 12 Voice Recorder Kit - MIN 3201649

Install the LIFEPAK 12 voice recorder assembly as follows:

1. Align the LIFEPAK 12 voice recorder connector with the LIFEPAK 12 defibrillator/monitor system connector (located on the rear of the LIFEPAK 12 defibrillator/monitor).
2. Connect the LIFEPAK 12 voice recorder connector to the LIFEPAK 12 defibrillator/monitor system connector. Ensure that the alignment pin near the top of the voice recorder is inserted into the locating hole on the back of the LIFEPAK 12 defibrillator/monitor, and verify that no wires are pinched between the voice recorder and the LIFEPAK 12 defibrillator/monitor.
3. Mount the voice recorder with two 6-32 × .375 screws.

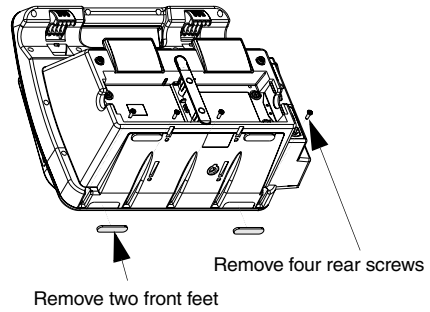
Removing the LIFEPAK 12 Voice Recorder

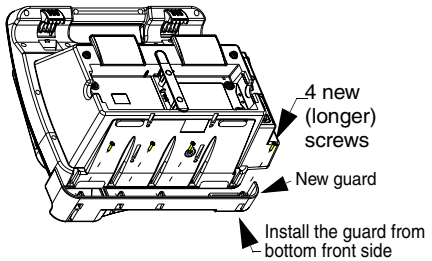
Remove the LIFEPAK 12 voice recorder assembly as follows:

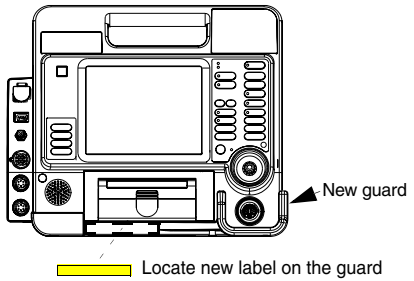
1. Remove the two 6-32 × .375 screws that secure voice recorder assembly to the LIFEPAK 12 defibrillator/monitor.
2. Pull the voice recorder assembly straight back, disconnecting the LIFEPAK 12 voice recorder connector from the LIFEPAK 12 defibrillator/monitor system connector.

Therapy Connector Guard Installation/Removal

Kit–MIN 3206037







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Install the LIFEPAK Therapy Connector Guard kit to provide additional protection to the therapy cable where it connects to the LIFEPAK 12.

Kit contents:

- Therapy Connector Guard (Ref: MIN 3204034-001)
- Warning (Explosion Hazard) Label sheet (Ref: MIN 3205136-900)
- (4) Screws, #6-32 x 0.75 inch long (Ref: MIN 202253-576)

Prepare for Installation:

1. Disconnect the therapy connector.
2. Remove the defibrillator from the soft case.
3. Turn the defibrillator rear-side up.
4. Remove the for screws as shown.
5. Remove the two front feet as shown.

(Continued on next page)

Therapy Connector Guard Installation/Removal *(continued)*

Install the Guard:

6. Install the therapy connector guard onto the defibrillator from the bottom front of the defibrillator.
7. Use the four new, longer, 6-32 screws to connect the guard to the defibrillator from the rear of the defibrillator.
8. Install the appropriate Warning (Explosion Hazard) label to the front of the guard where shown.
9. Replace the defibrillator into the soft case.
10. Reconnect the therapy cable to the therapy connector.

Removal:

To remove the therapy connector guard, reverse the steps in the previous installation procedure.

Therapy Cable Shield Installation/Removal

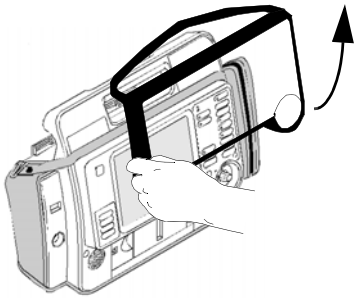
Installing the LIFEPAK 12 Cable Shield Kit, MIN 3203003

Install the LIFEPAK 12 Cable Shield kit to provide additional protection to the therapy cable where it connects to the LIFEPAK 12 defibrillator/monitor.

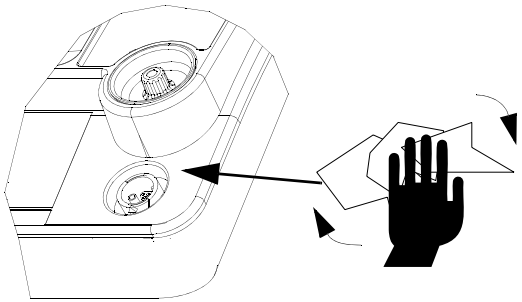
1. If the LIFEPAK 12 defibrillator/monitor has any accessories that occupy the area around the therapy connector, remove them and set them aside.

1a.

1b.



2. Clean the therapy connector area well, using a soft cloth or an alcohol wipe.



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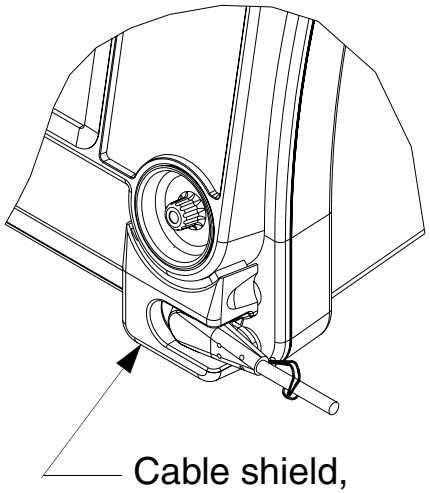
Therapy Cable Shield Installation/Removal *(continued)*

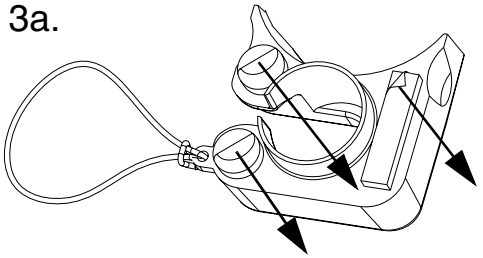
Installing the LIFEPAK 12 Cable Shield Kit, MIN 3203003 (continued)

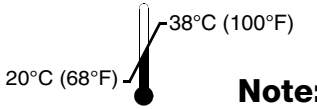


Cable shield, installed

3. Remove the cable shield from its packaging and orient it with the adhesive-backed hook-and-loop fastener material toward you. Peel the backing from the adhesive (three places).

3a.

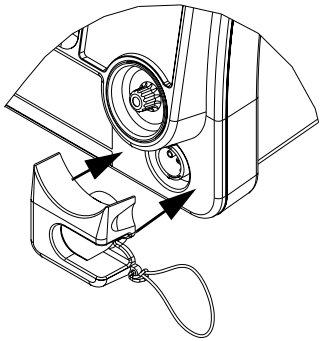




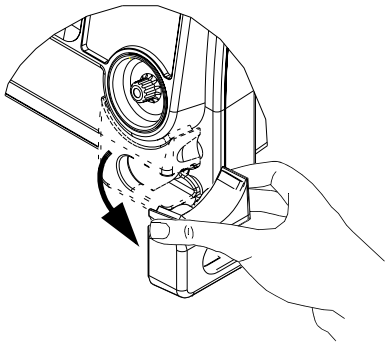
Note: Adhesive mounting is intended for application at temperatures shown.

4. Apply the cable shield, with mounting tape facing the defibrillator, as shown:

4a.



4b.



Rotate the cable shield off of the defibrillator as shown, to release the fastener hooks from the loops. Ensure that the three released fastener pieces stay with the defibrillator.

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Parts Lists and Assembly Diagrams

This section is a hierarchical reference used to identify components needed to repair the LIFEPAK 12 defibrillator/monitor.

Defibrillator devices with the SpO2 option manufactured prior to July 1999 will have different parts than the ones shown.

Navigation with the Configurators

Begin by locating your assembly drawing in the **Assembly Drawing Configurator**. Follow links in the assembly to access the parts lists.

1. From the Section Contents (previous page), click the "**Assembly Drawing Configurator**" link.

2. Click one of the links presented to you ("Front Labels," "Front Case," "System/Memory/Therapy PCB," "Rear Case," or "Options") applicable to your part.

If you know the MIN (part number) that you are looking for, you can go directly to the parts list by clicking on the parts list links in the Configurator. Follow step 2 above.

Note: The MIN (part number) can be typed into the search feature in Acrobat.

The LIFEPAK 12 has many optional configurations. Use the **Option Configurator** to locate the specific assembly and parts list required for an option. The **Option Configurator** guides you to the correct configuration through a series of questions. Clicking on the item number displays a parts list with the MIN that corresponds to that item number. Clicking on the item number in the parts list displays a detail drawing of the part in a typical context.

From the Section Contents (previous page), click the "**Option Configurator**" link.

(Continued on next page)

Navigation with the Configurators *(continued)*

Language options are displayed in the **Notes** column of each parts list. Click the text **Select other language** for a list of MINs (part numbers) for German, French, and other languages.

The **A12 Printer (50 mm) Assembly Drawing** and **A12 Printer (50 mm) Parts List** provide exploded views to visually locate each item.

The **Interconnect Drawing—Monophasic** or the **Interconnect Drawing—Biphasic** provides detailed interconnect information for each assembly and cable, with reference designations, for example, A01 System PCB, W05 Power PCB/Contact PCB Cable, and so forth.

The **Service Repair Kits** contain all items needed to replace major components. Each kit has its own MIN.

The **Part Number and Serial Number** description is useful for decoding the SN on the label, which displays the device manufacturing code.

Refer to **How to Order Parts** to obtain replacement parts for the device.

For additional parts lists, including items necessary to keep the device in clinical service, refer to **Ordering Devices, Supplies, and Accessories**.

Section Glossary

The following are definitions of terms used in this section.

- **Common Parts** are components used in every version of the defibrillator device, regardless of options and operating language. Common Parts are divided into Front Case, Rear Case, System/Memory/Therapy PCB Assembly.
- **Internal Parts** are components internal to the case that are specific to your device. Click an MIN (part number) to display the list of items or click an item number to jump to the associated assembly drawing.
- **External Parts** are components external to the case that are specific to your device.
- An **Item** is the reference designator for each unique part on the defibrillator device. Most major parts have detail drawings included. View them by clicking the item number.
- The **Quantity** identifies how many of the listed part is used in the assembly at the heading of the list.
- **MIN** refers to the Medtronic manufacturer's item number.
- **CAT**. number is the reference designator used for ordering each part.
- **Part Description** is a brief description of the part in this row.
- **Defibrillator PN** is the number that identifies the model of each device.

(Continued on next page)

Section Glossary *(continued)*

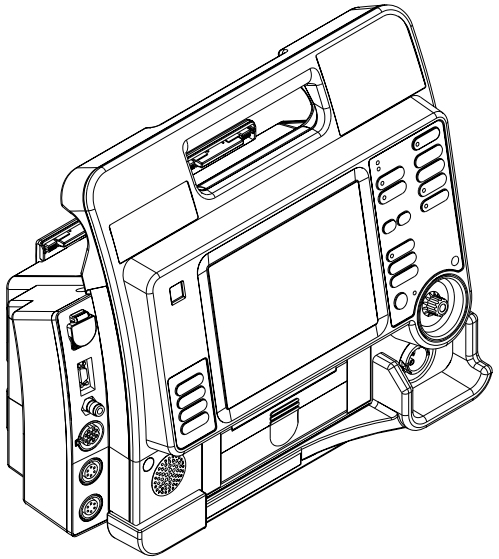
- **Options** are assemblies that are not required on the basic defibrillator device and can be specified by the customer when purchased. Parts on these assemblies may be referred to as optional parts.
- A **Reference Designator** is similar to an item number and designates that the part is a main component and a detail drawing of that part is also included. Reference Designators begin with a letter.

Assembly Drawing Configurator

Introduction

Click a link below to view a detailed assembly.

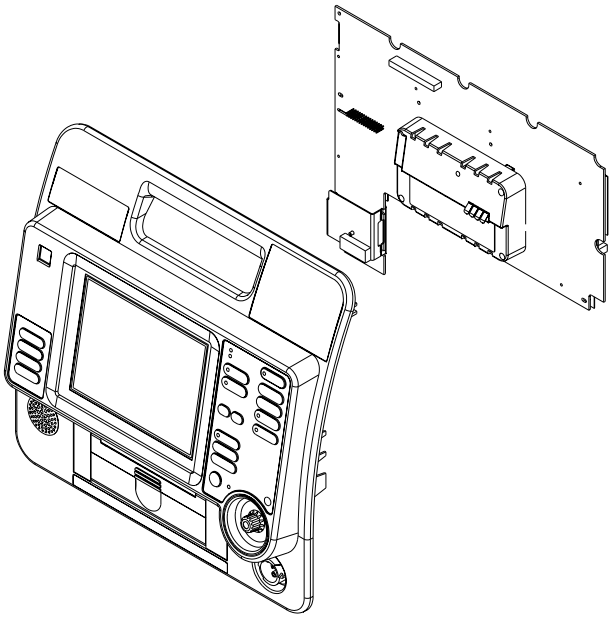
Front Labeling & Therapy Cable Protection Drawing



For Parameter Bezel options, go to the Option Configurator

Front Case Assembly Drawing

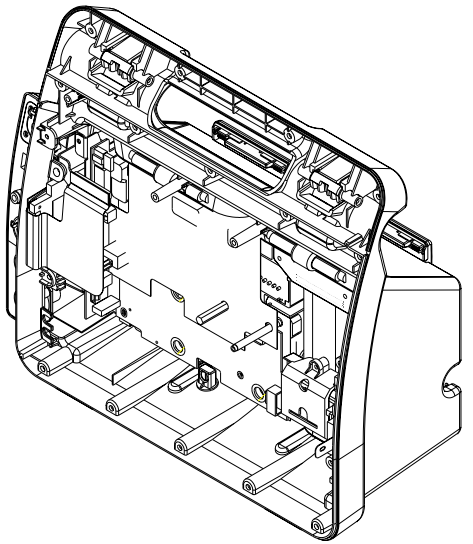
System/Memory/ Therapy PCB Assembly Drawing



Rear Case Common Assembly Drawing

Monophasic Only

Biphasic Only



(Continued on next page)

Assembly Drawing Configurator *(continued)*

Device Optional Assemblies

A06 OEM PCB

A11 EL Display Assembly

A11 LCD Assembly

A16 Nellcor SpO2 Module

A16 Masimo SpO2 Module

A21 NIBP Module

A23 CO2 Module

W07 ECG Connector Assembly

W22 Nellcor SpO2 Connector Assembly

W22 Masimo SpO2 Connector Assembly

W28 CO2 Connector Assembly

W33 IP Connector Assembly

50 mm Printer

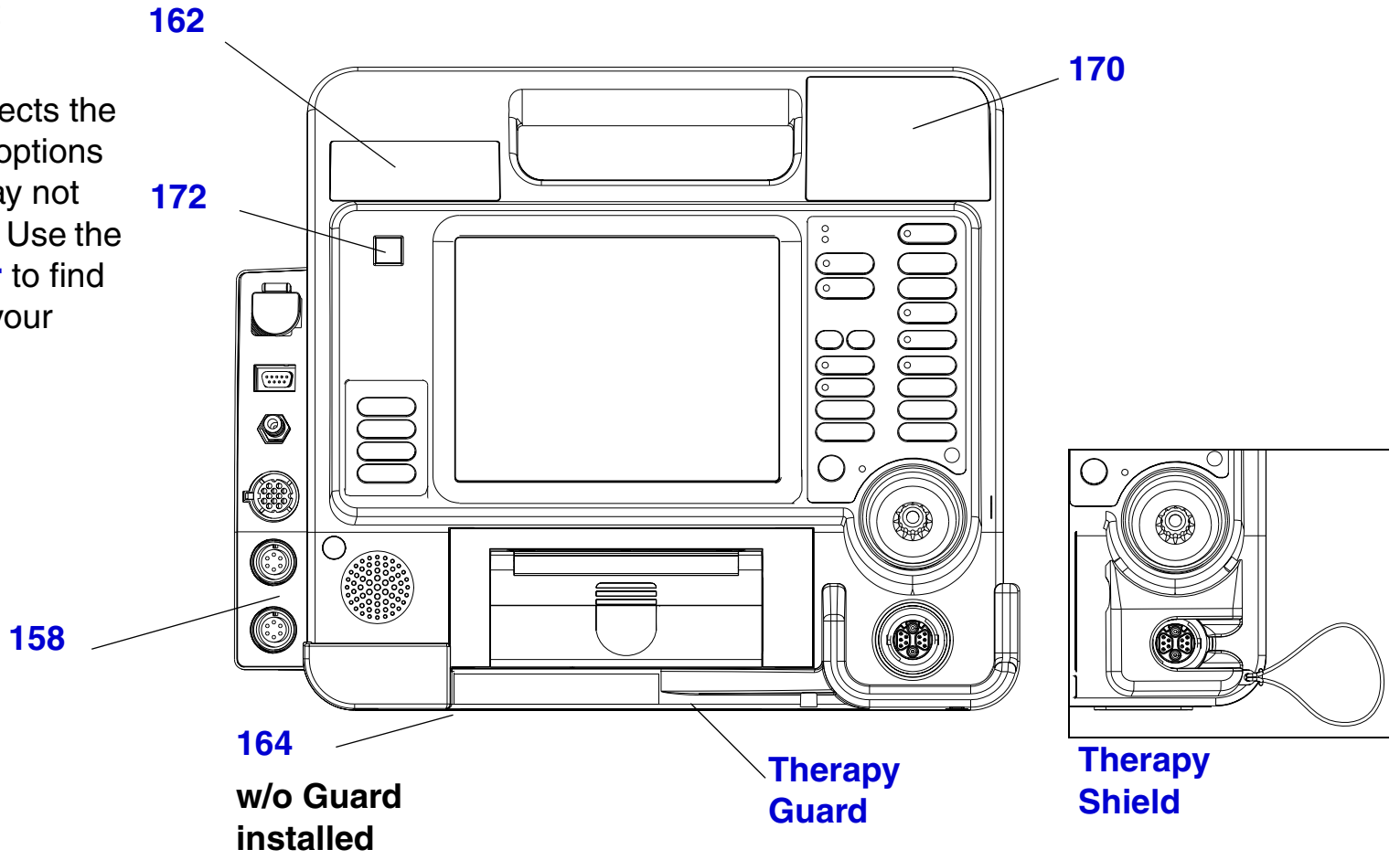
100 mm Printer
(Components not shown)

Standard Paddles Assembly

Front Labeling and Therapy Cable Protectors Drawings

Click an item number to see the corresponding MIN (part number).

Note: This drawing reflects the device with all available options installed. Your device may not have all of these options. Use the **Parts List Configurator** to find the parts list specific to your device.



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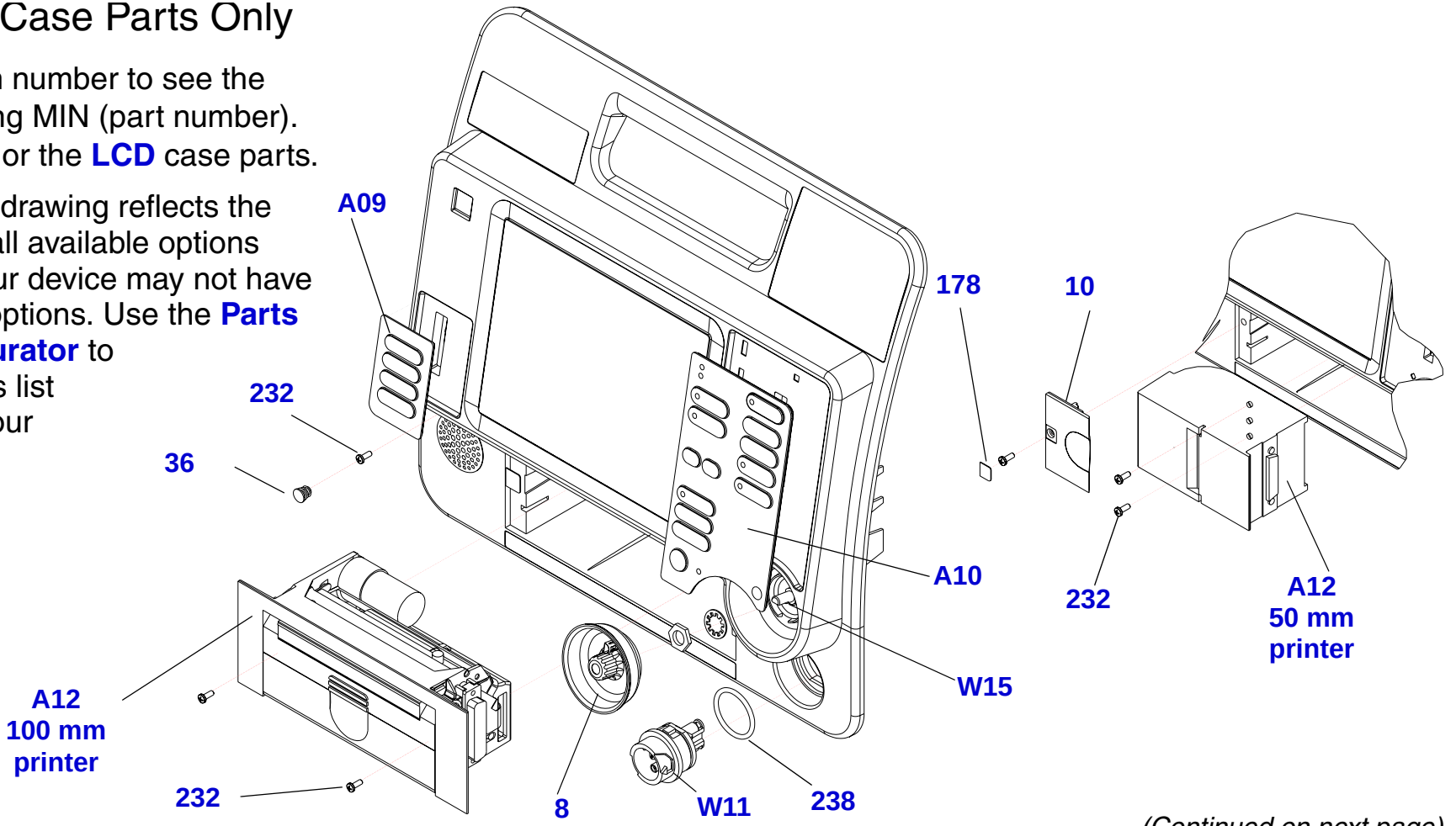
Front Case Assembly Drawings

Common Case Parts Only

Click an item number to see the corresponding MIN (part number). View the **EL** or the **LCD** case parts.

Note: This drawing reflects the device with all available options installed. Your device may not have all of these options. Use the **Parts List Configurator** to find the parts list specific to your device.



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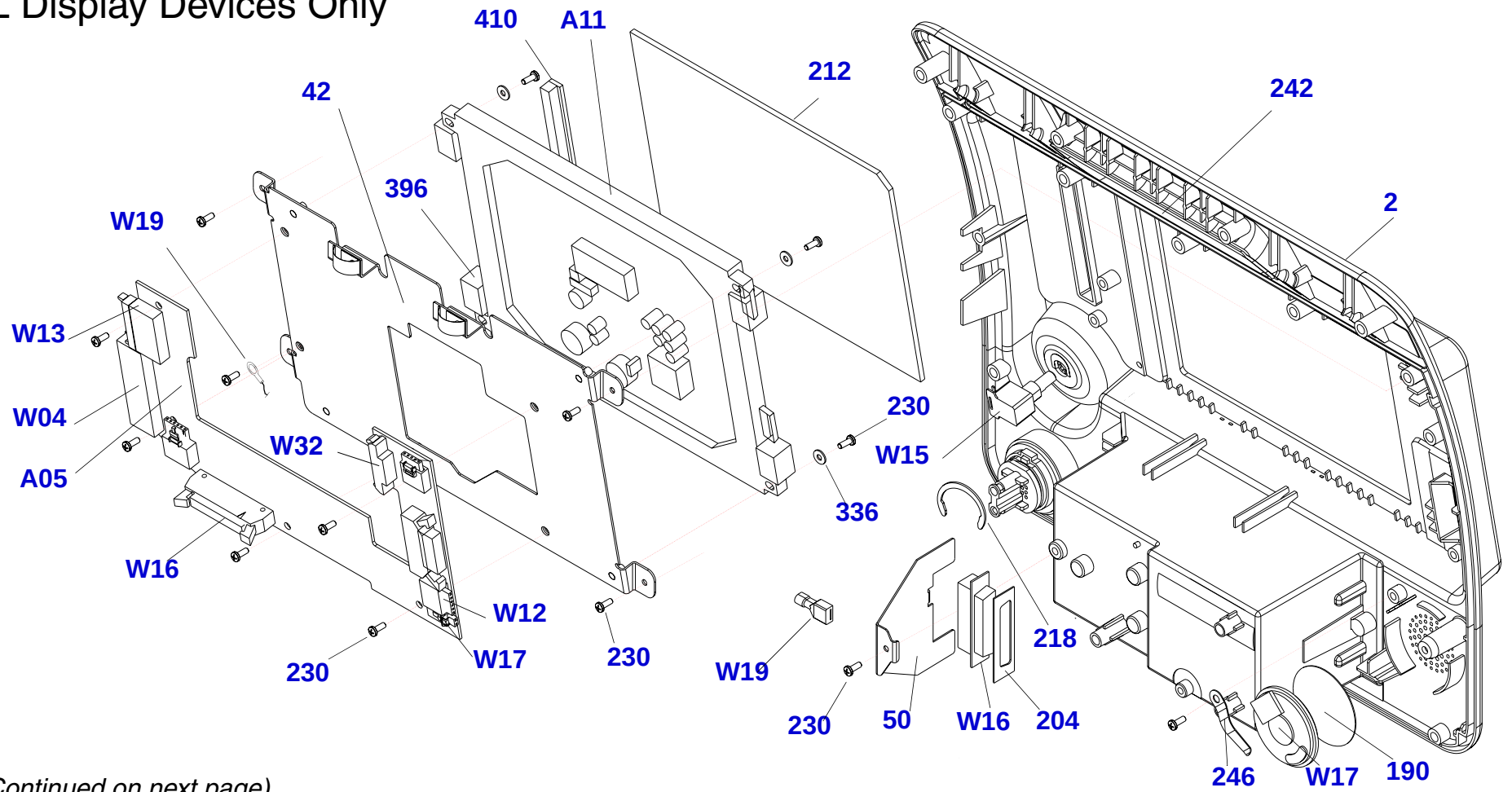
(Continued on next page)

Front Case Assembly Drawings *(continued)*

EL Display Devices Only



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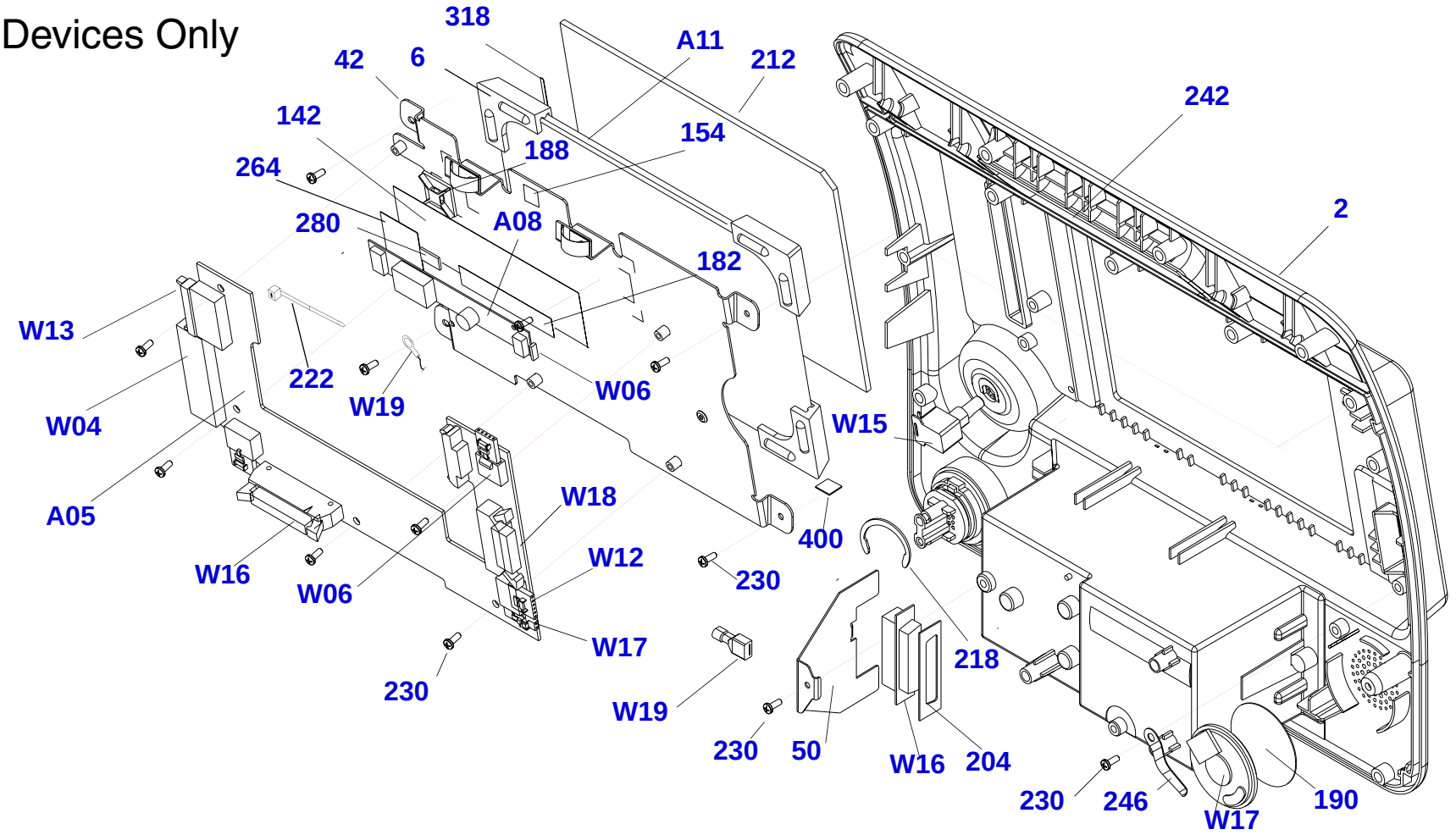
(Continued on next page)

Front Case Assembly Drawings *(continued)*

LCD Devices Only



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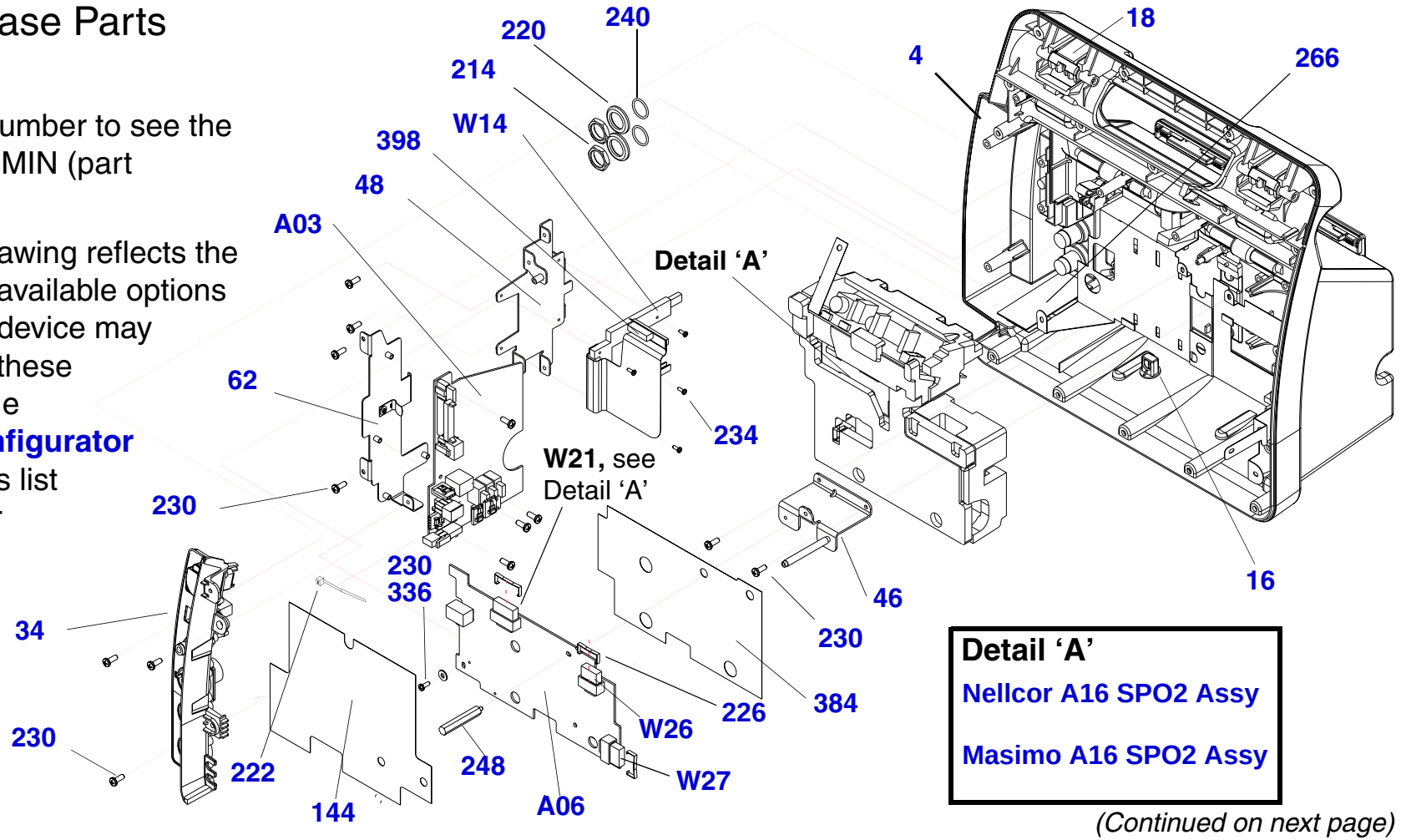
Rear Case Assembly Drawings

Common Case Parts Only

Click an item number to see the corresponding MIN (part number).

Note: This drawing reflects the device with all available options installed. Your device may not have all of these options. Use the **Parts List Configurator** to find the parts list specific to your device.



Detail 'A'

Nellcor A16 SPO2 Assy

Masimo A16 SPO2 Assy

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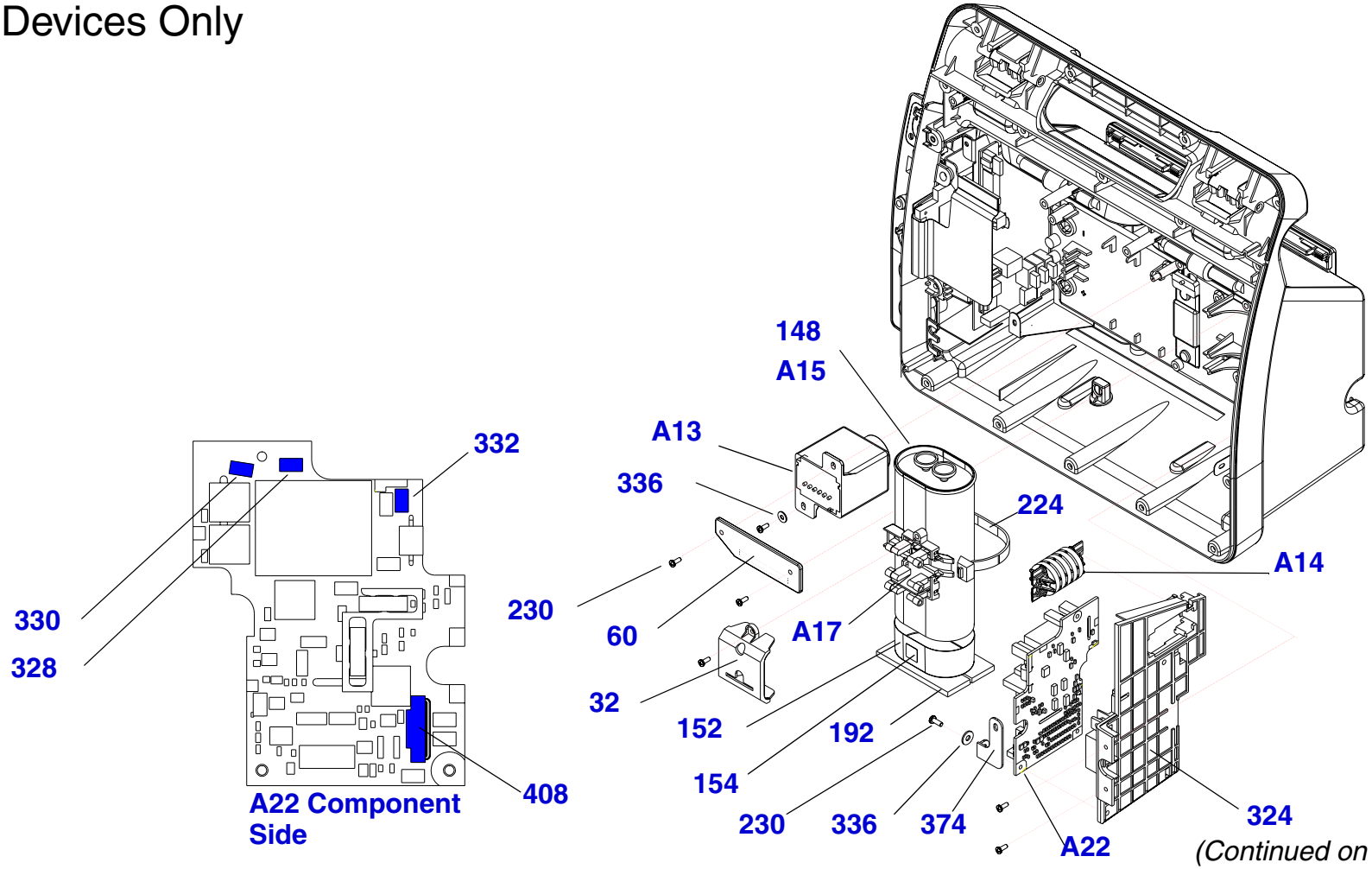
(Continued on next page)

Rear Case Assembly Drawings *(continued)*

Biphasic Devices Only



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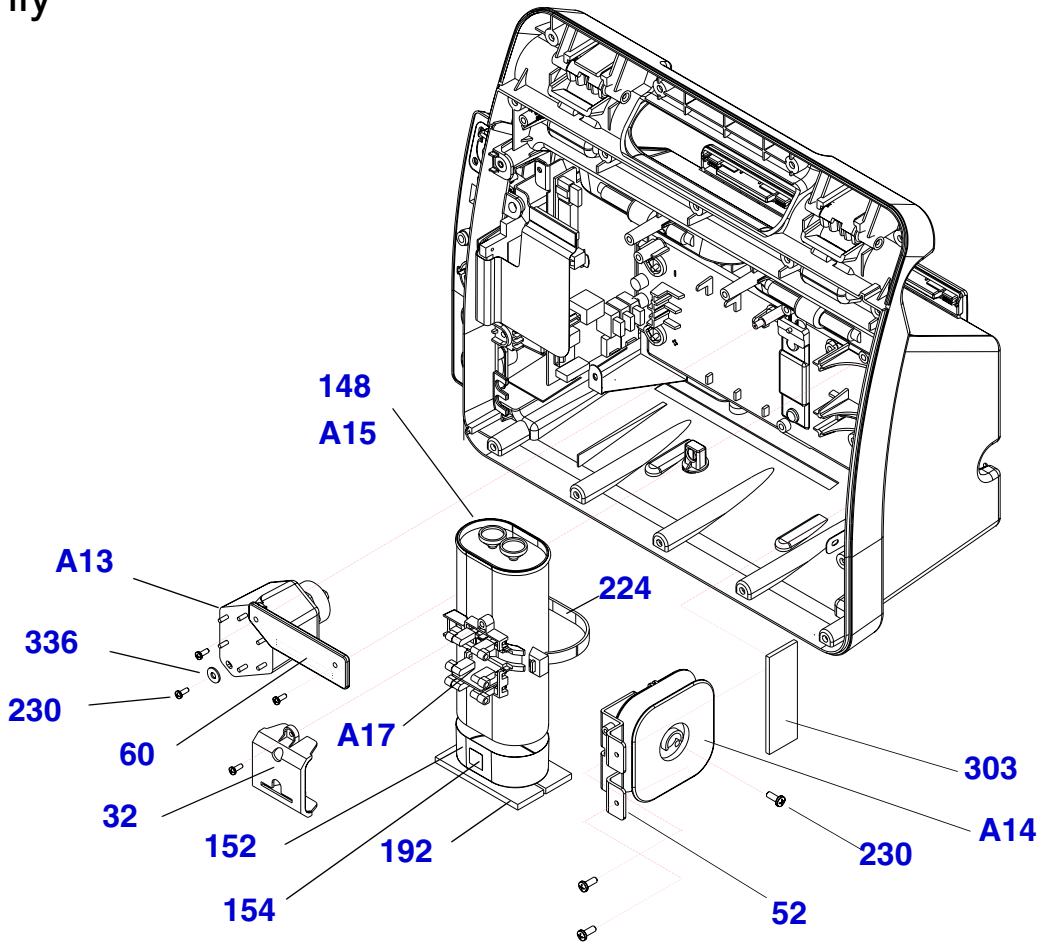
(Continued on next page)

Rear Case Assembly Drawings *(continued)*

Monophasic Devices Only



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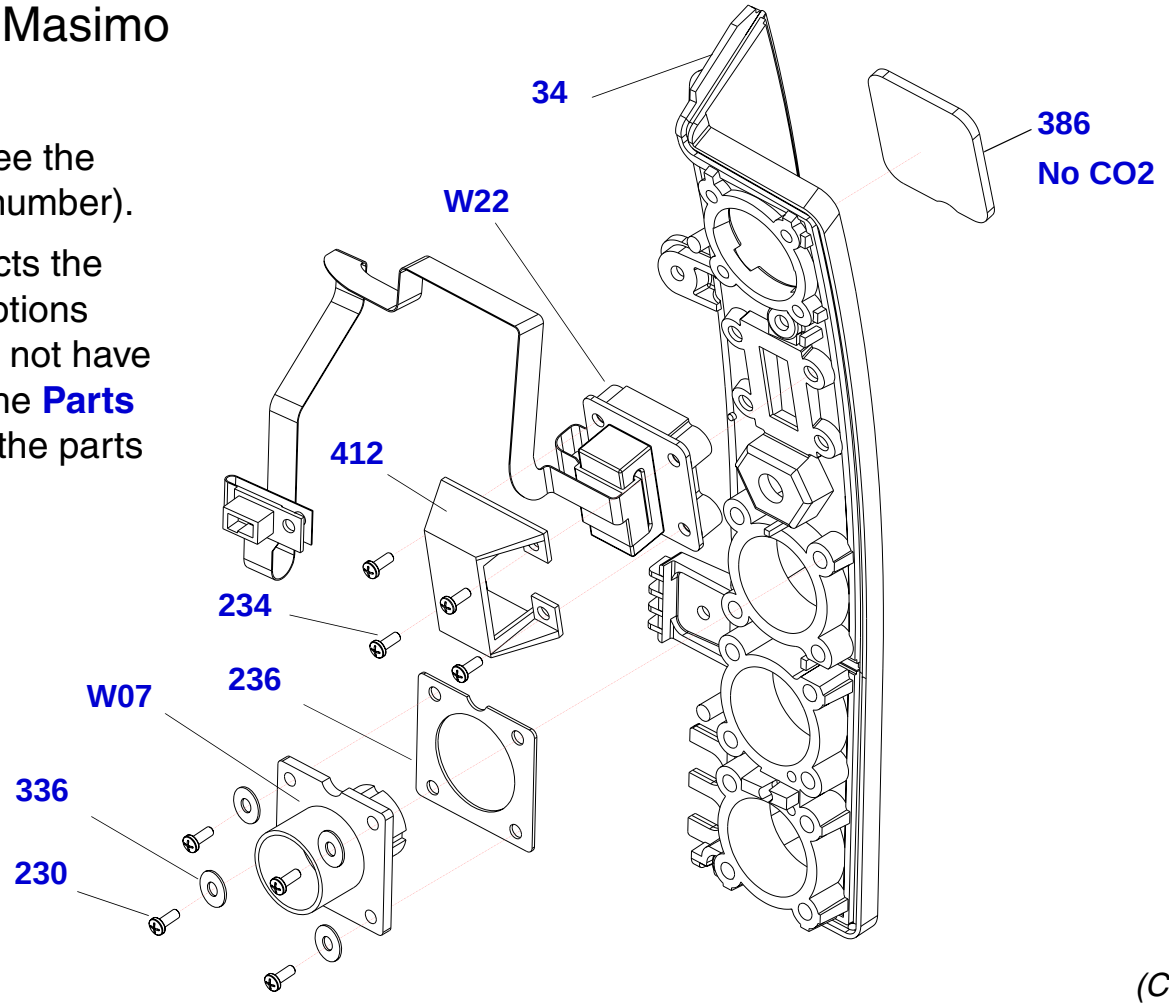
(Continued on next page)

Rear Case Assembly Drawings *(continued)*

Bezel with ECG and Masimo SpO2 option shown

Click an item number to see the corresponding MIN (part number).

Note: This drawing reflects the device with all available options installed. Your device may not have all of these options. Use the **Parts List Configurator** to find the parts list specific to your device.



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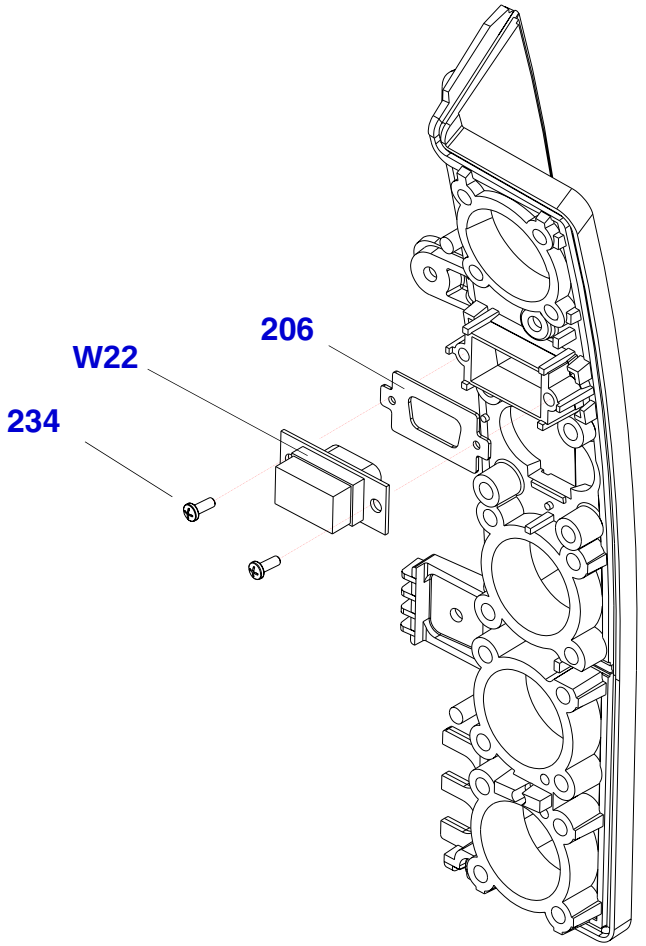
(Continued on next page)

Rear Case Assembly Drawings *(continued)*

Bezel with Nellcor SpO2 option shown

Click an item number to see the corresponding MIN (part number).

Note: This drawing reflects the device with all available options installed. Your device may not have all of these options. Use the **Parts List Configurator** to find the parts list specific to your device.



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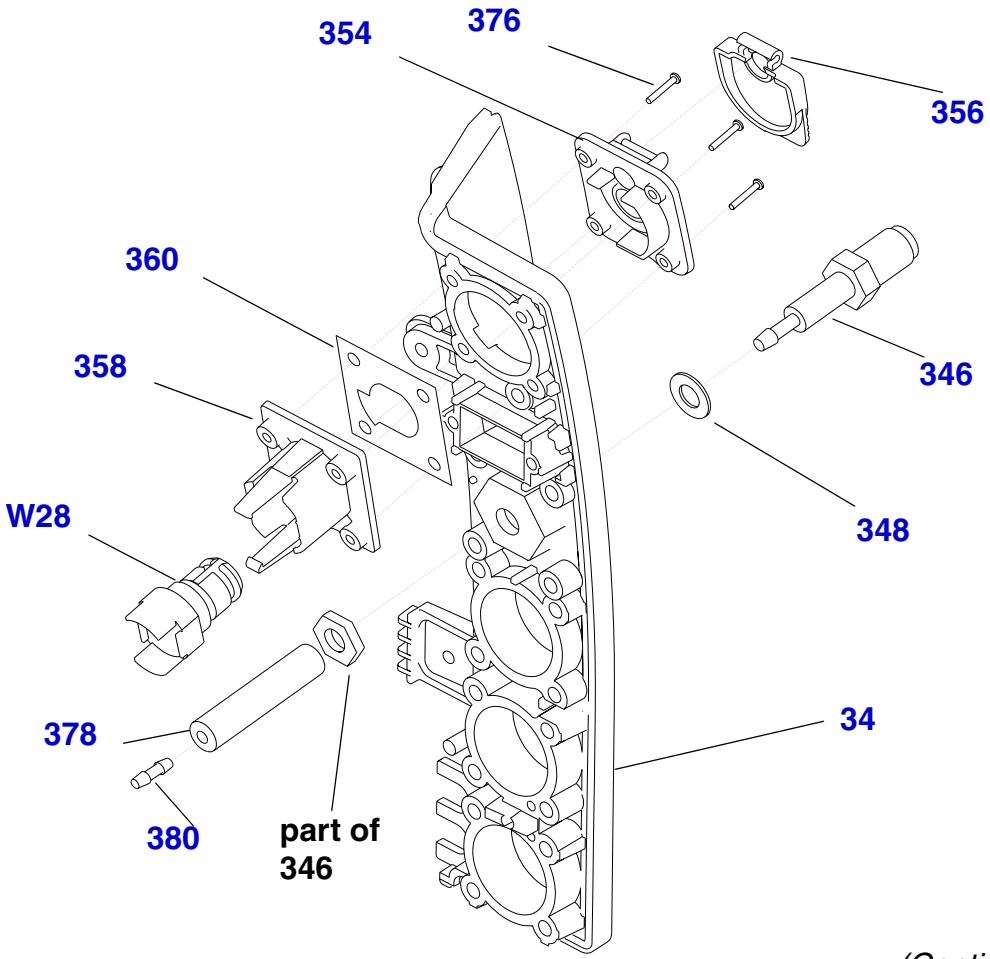
(Continued on next page)

Rear Case Assembly Drawings *(continued)*

Bezel with CO2 and NIBP options shown

Click an item number to see the corresponding MIN (part number).

Note: This drawing reflects the device with all available options installed. Your device may not have all of these options. Use the **Parts List Configurator** to find the parts list specific to your device.



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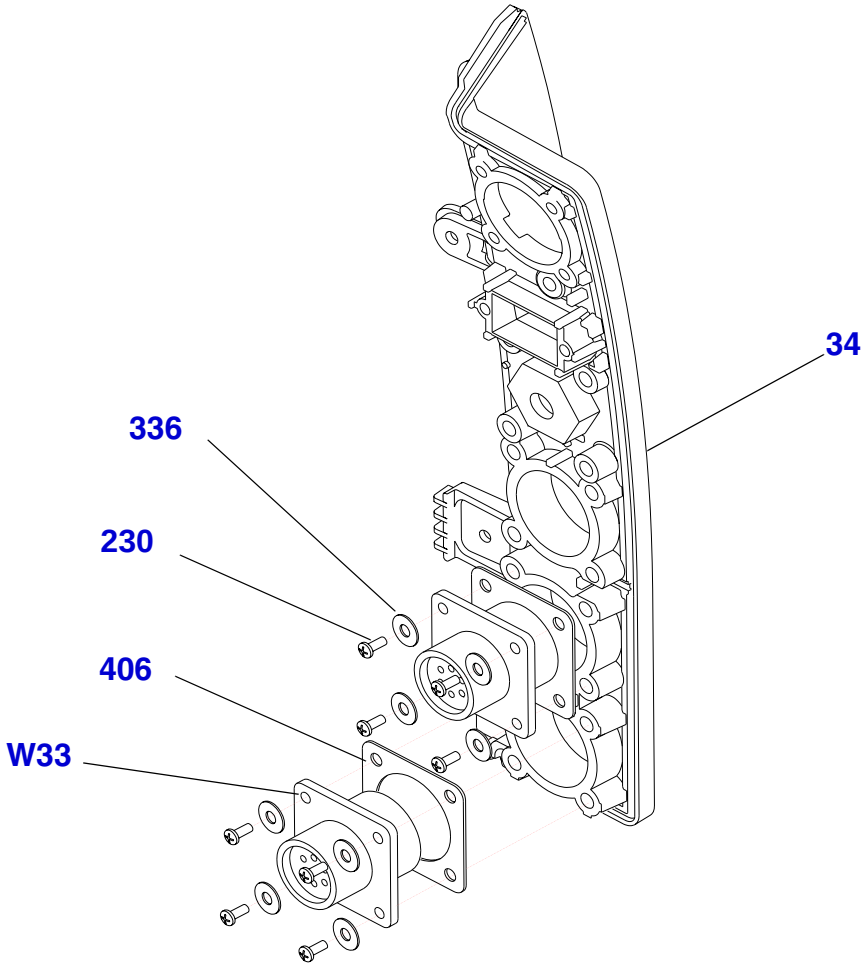
(Continued on next page)

Rear Case Assembly Drawings *(continued)*

Bezel with IP option shown

Click an item number to see the corresponding MIN (part number).

Note: This drawing reflects the device with all available options installed. Your device may not have all of these options. Use the **Parts List Configurator** to find the parts list specific to your device.



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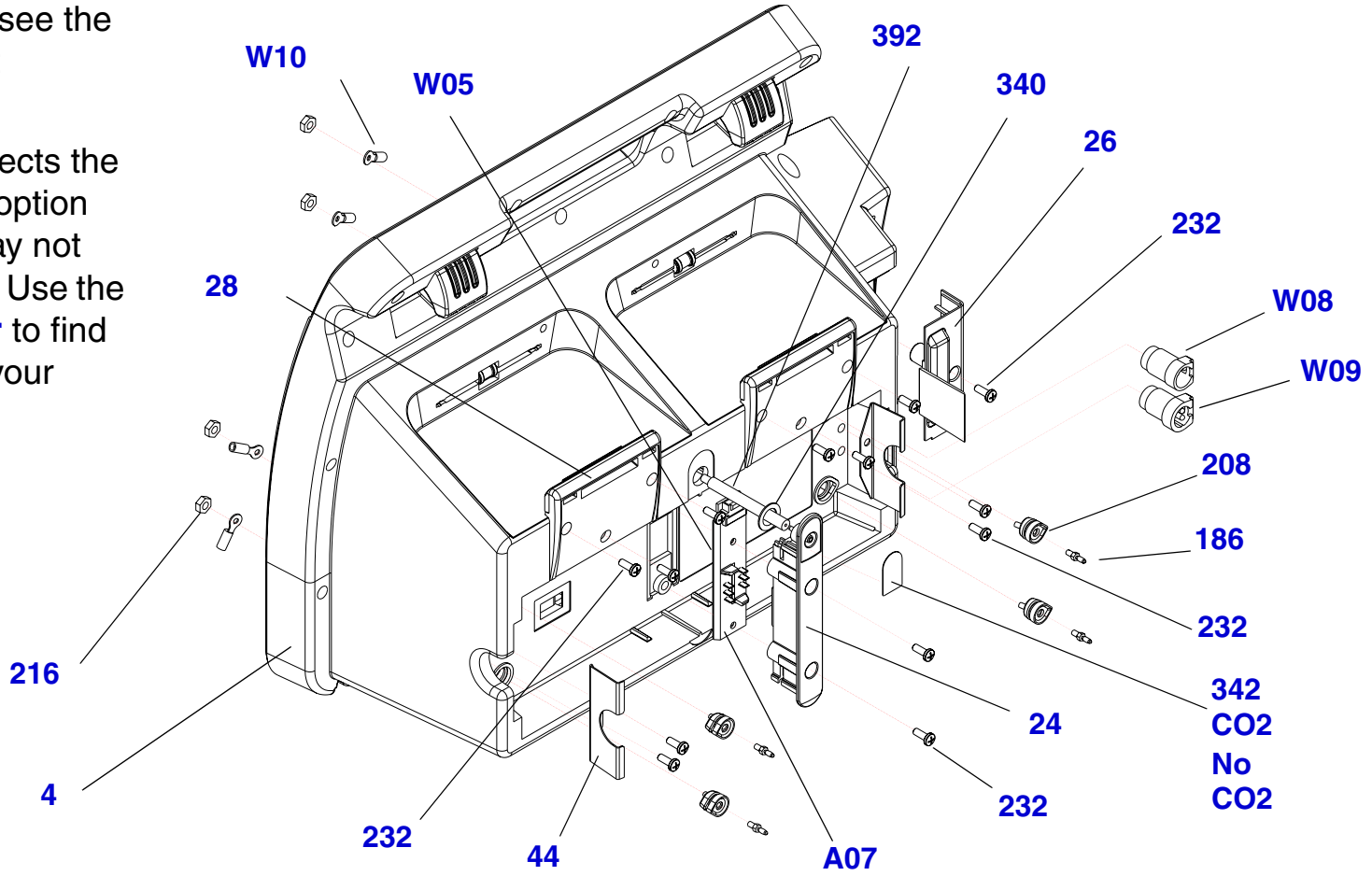
(Continued on next page)

Rear Case Assembly Drawings *(continued)*

Click an item number to see the corresponding MIN (part number).

Note: This drawing reflects the device with all available option installed. Your device may not have all of these options. Use the **Parts List Configurator** to find the parts list specific to your device.



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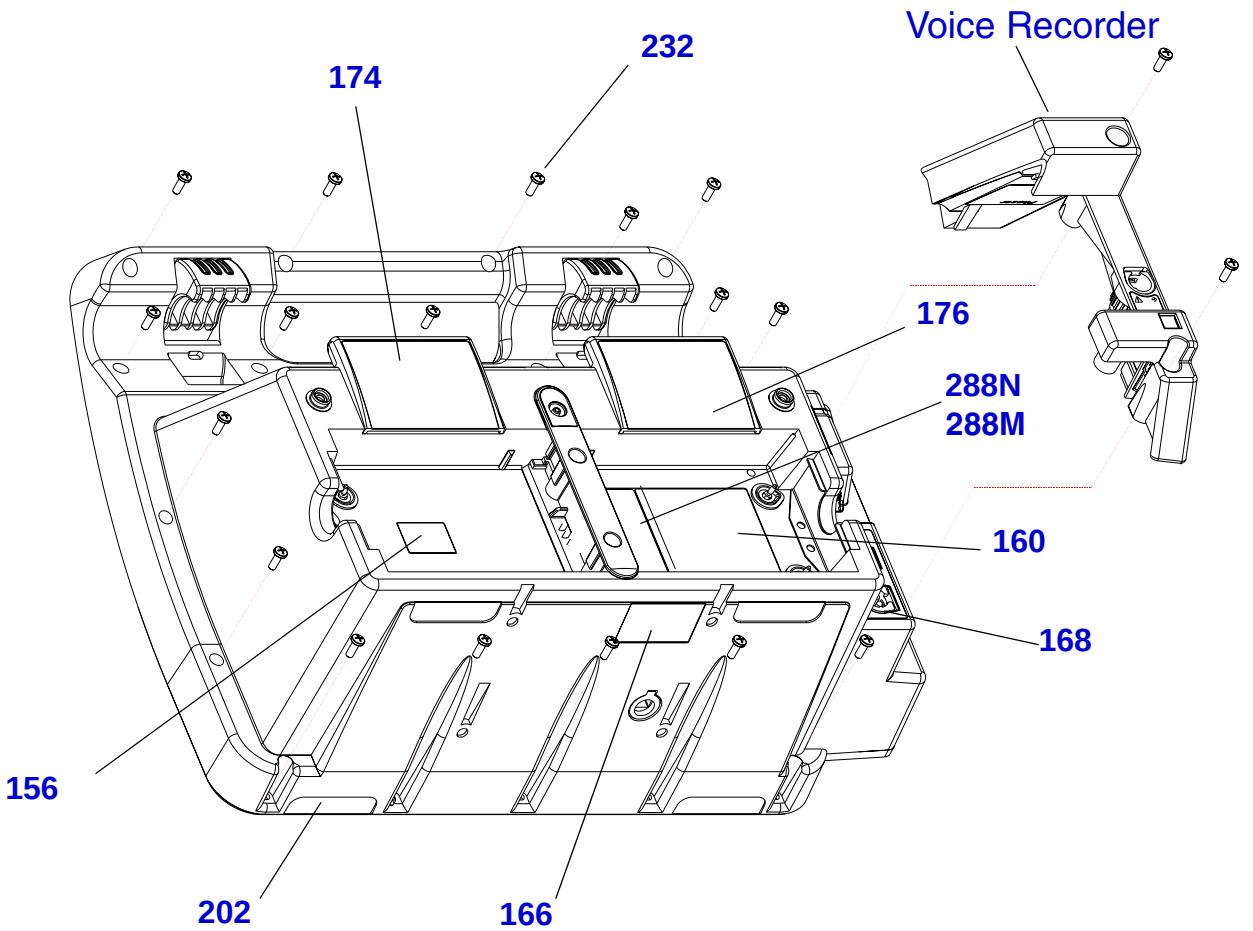
(Continued on next page)

Rear Case Assembly Drawings *(continued)*

Click an item number to see the corresponding MIN (part number).

Note: This drawing reflects the device with all available options installed. Your device may not have all of these options. Use the **Parts List Configurator** to find the parts list specific to your device.



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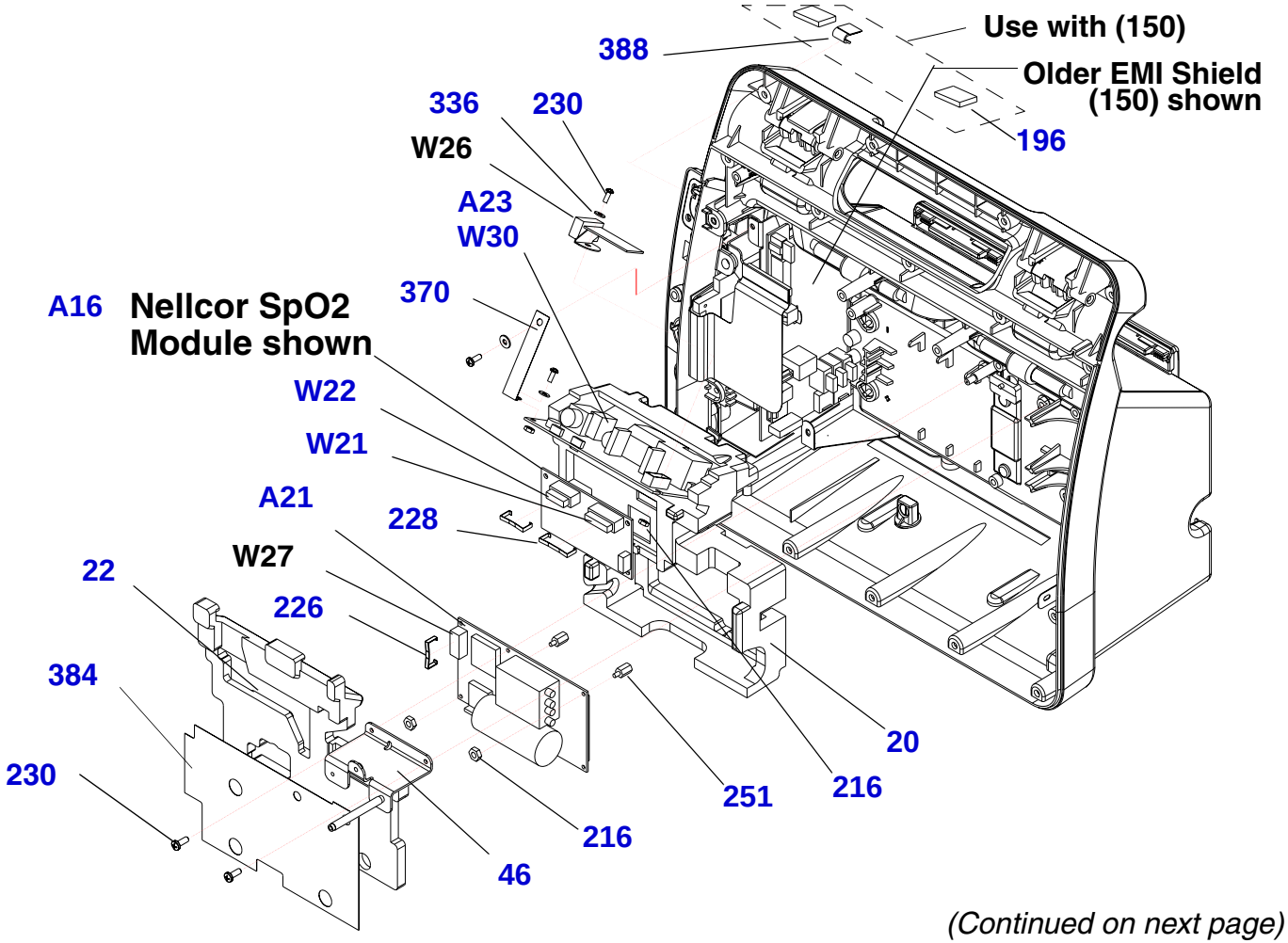
(Continued on next page)

Rear Case Assembly Drawings *(continued)*

Detail A
Part of Rear Case

Click an item number to see the corresponding MIN (part number).

Note: This drawing reflects the device with all available options installed. Your device may not have all of these options. Use the **Parts List Configurator** to find the parts list specific to your device.



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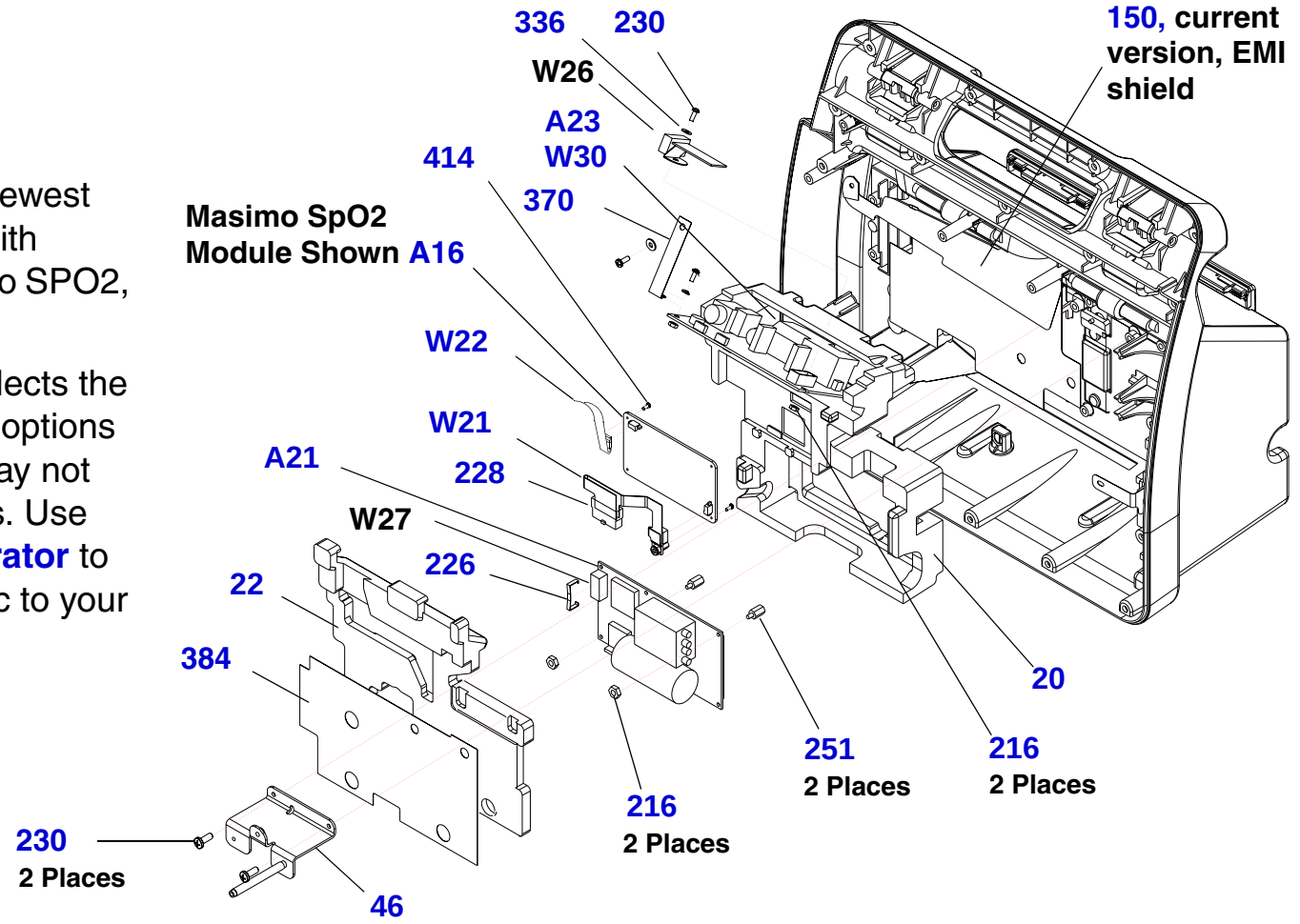
(Continued on next page)

Rear Case Assembly Drawings *(continued)*

Detail A
Part of Rear Case (continued)

This detail reflects the newest product configuration, with biphasic therapy, Masimo SPO2, and the new EMI shield.

Note: This drawing reflects the device with all available options installed. Your device may not have all of these options. Use the **Parts List Configurator** to find the parts list specific to your device.



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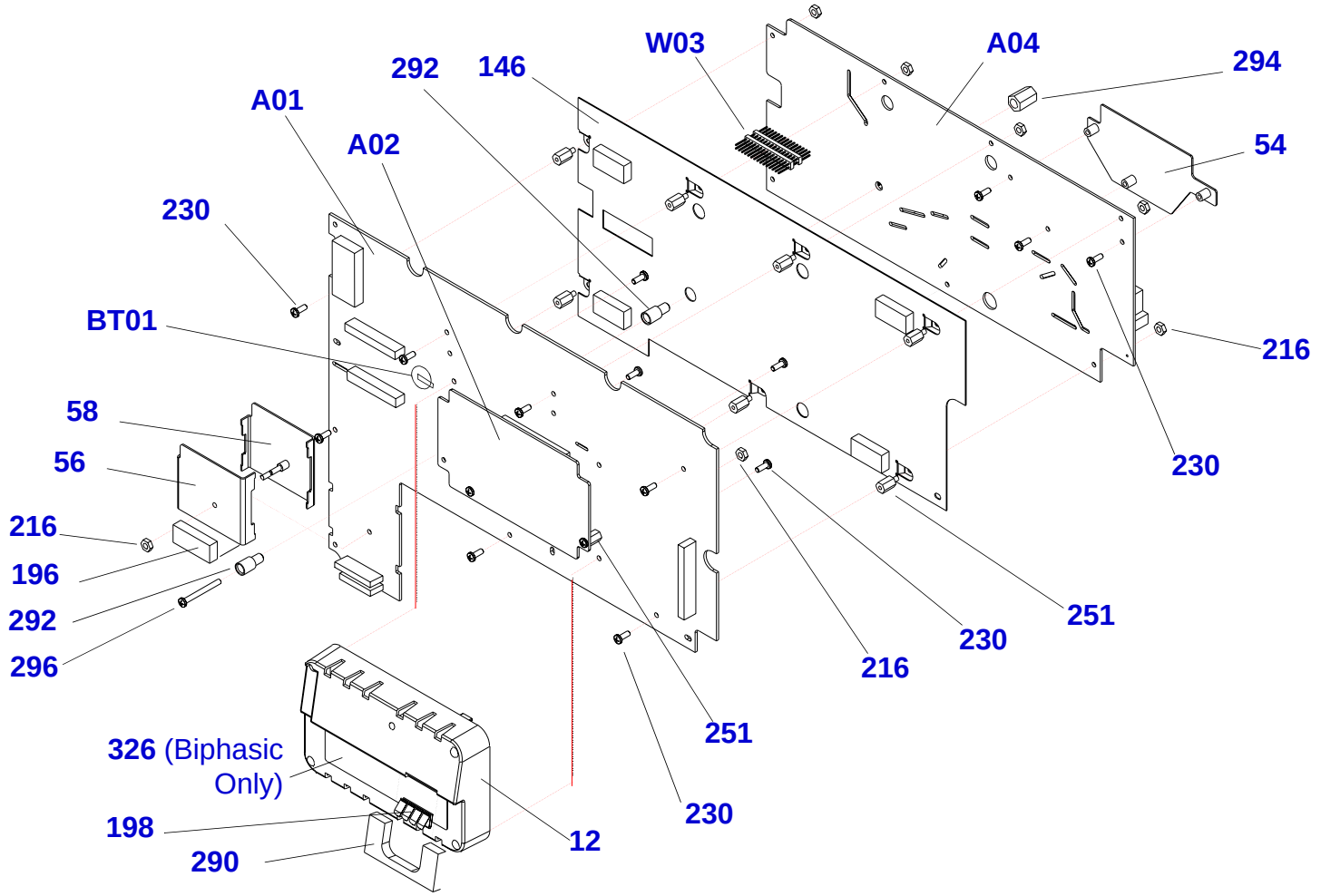
System/Memory/Therapy PCB Assembly Drawing



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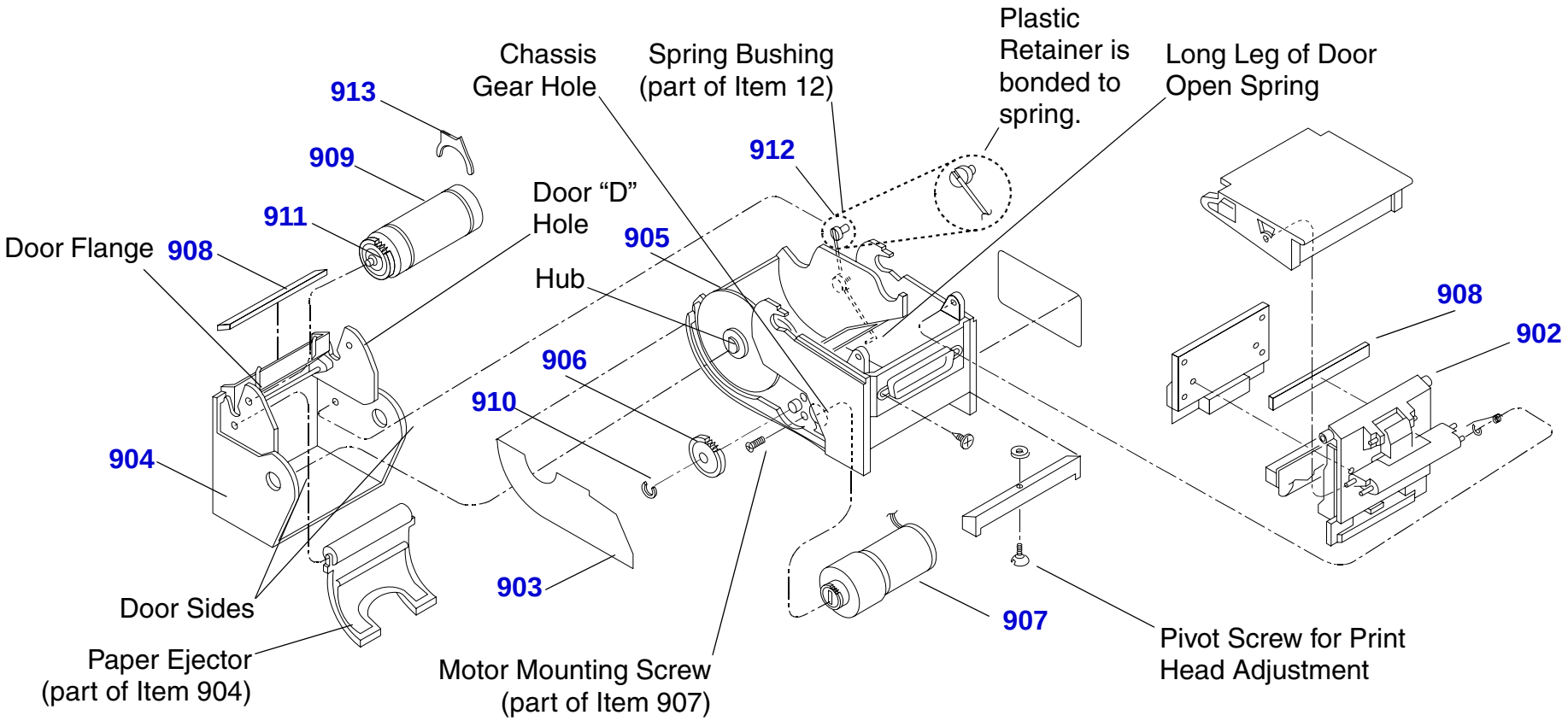
A12 Printer (50 mm) Assembly Drawing

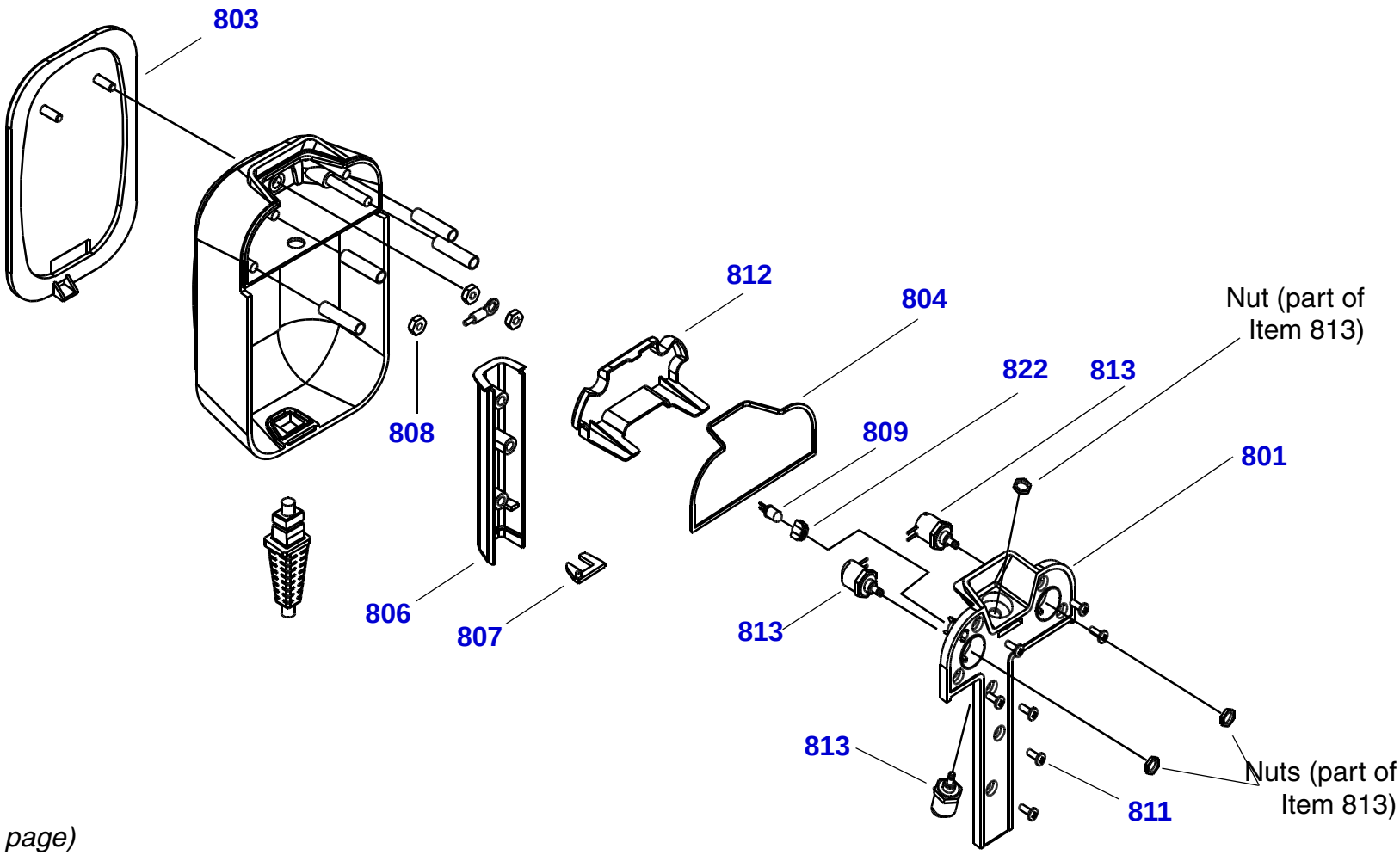


Note: Parts without item numbers are shown for reference only and are not available for replacement.

Standard Paddle Assembly Drawing

Apex

Note: Refer to the **Parts List** for language-specific label information.

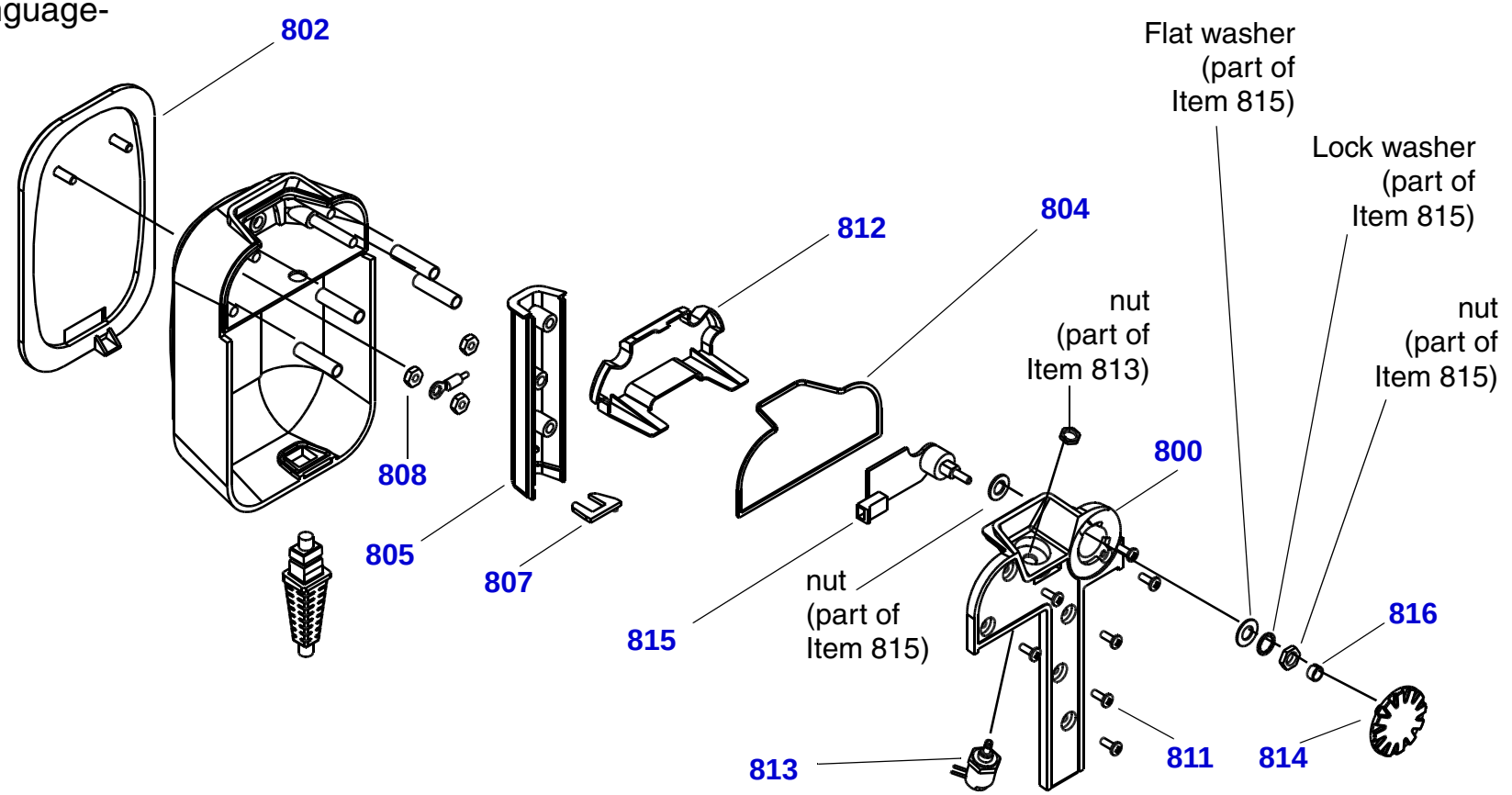


(Continued on next page)

Standard Paddle Assembly Drawing *(continued)*

Sternum

Note: Refer to the **Parts List** for language-specific label information.



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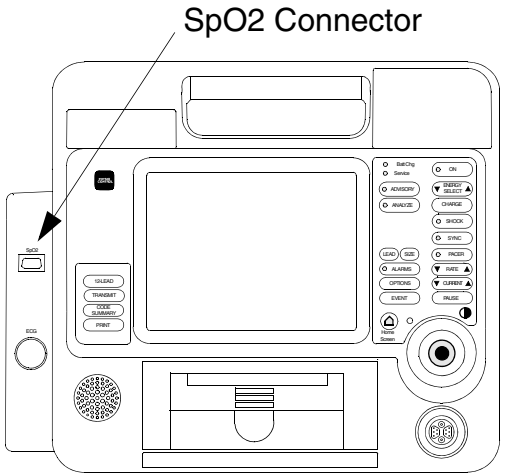
Parts List Configurator

Is SpO2 an Option?

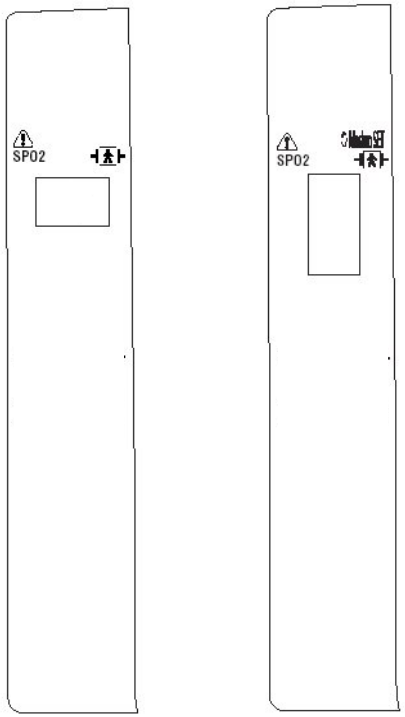


Does your device have an SpO2 Connector?	
Yes	**No**

(Continued on next page)

Parts List Configurator *(continued)*

Is 12-Lead Control an Option?



Nellcor Masimo

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Does your device have a SpO2 Connector?

Yes

Does your device have a Nellcor SpO2 or Masimo SpO2?

Nellcor **Masimo**

Start Over

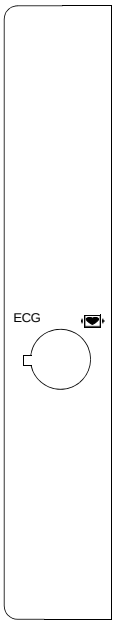
(Continued on next page)

Parts List Configurator *(continued)*

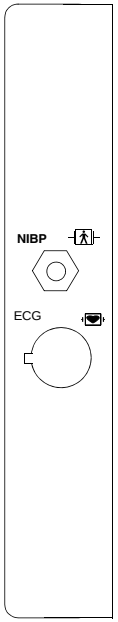
ECG Without SpO2

Choose the appropriate bezel.

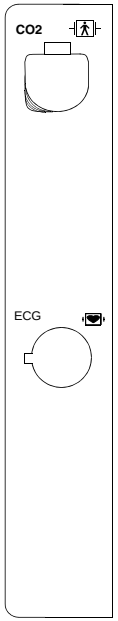
Go to Bezel Label Parts List



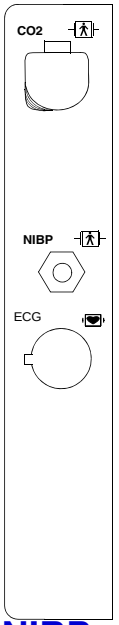
No other Options



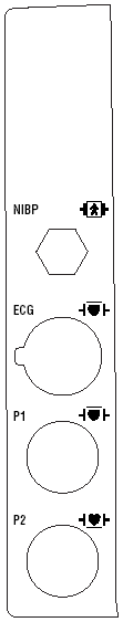
NIBP



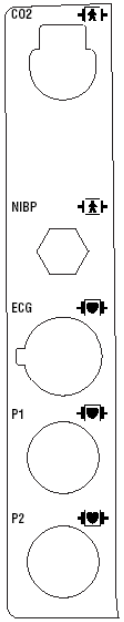
CO2



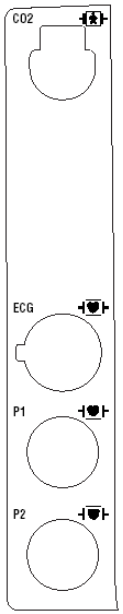
NIBP and CO2



NIBP and IP



NIBP, CO2 and IP



CO2 and IP

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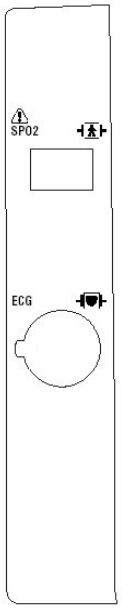
(Continued on next page)

Parts List Configurator *(continued)*

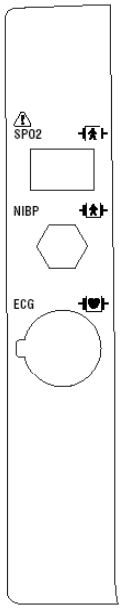
ECG, Nellcor SpO2

Choose the appropriate bezel.

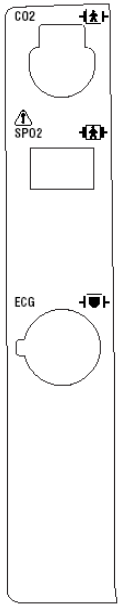
Go to Bezel Label Parts List



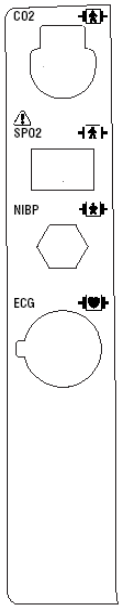
Nellcor SpO2



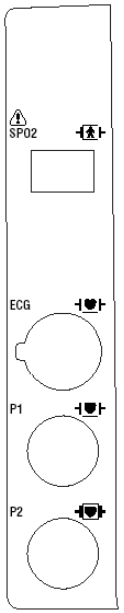
Nellcor SpO2 & NIBP



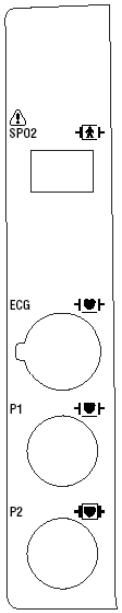
Nellcor SpO2 & CO2



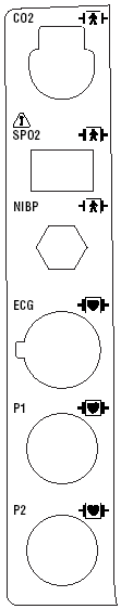
Nellcor SpO2, NIBP & CO2



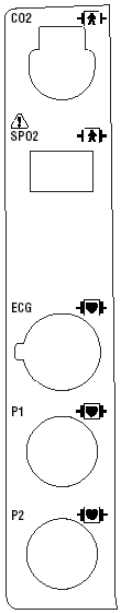
Nellcor SpO2 & IP



Nellcor SpO2, NIBP & IP



Nellcor SpO2, NIBP, CO2 & IP



Nellcor SpO2, CO2 & IP

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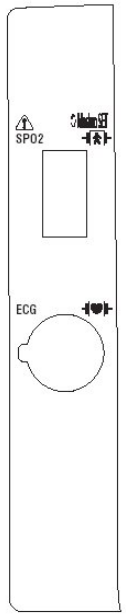
Parts List Configurator *(continued)*

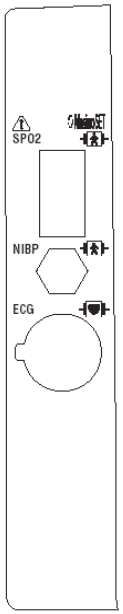
ECG, Masimo SpO2

Choose the appropriate bezel.

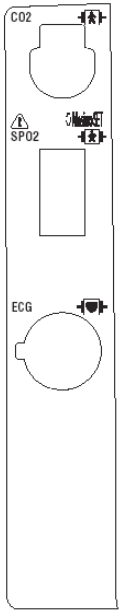
Go to Bezel Label Parts List



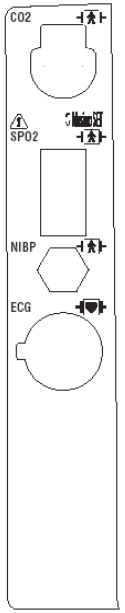
Masimo SpO2



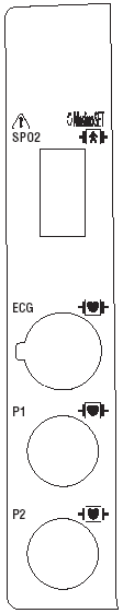
Masimo SpO2 & NIBP



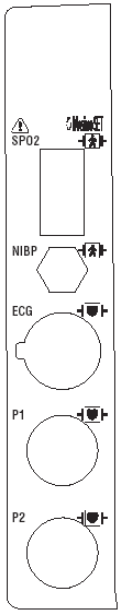
Masimo SpO2 & CO2



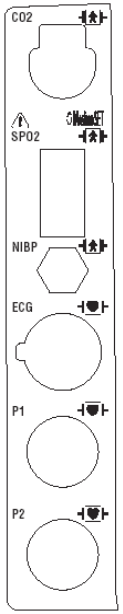
Masimo SpO2, NIBP & CO2



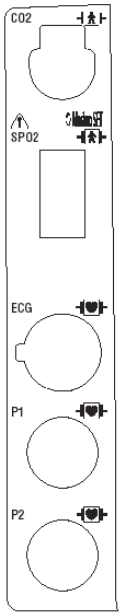
Masimo SpO2 & IP



Masimo SpO2, NIBP & IP



Masimo SpO2, NIBP, CO2 & IP



Masimo SpO2, CO2 & IP

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ECG (No Options)

External Parts

Item	Qty	MIN	Part Description	Note	CAT.
A09	1	3006189-00	Small Keypad (12-Lead) English	Select other language	21330-000044
A09	1	3006189-01	Small Keypad (3-lead) English	Select other language	21330-000045
A10	1	3006190-201	Large Keypad (Advisory - Pacer) English	Select other language	21330-000121
A10	1	3006190-237	Large Keypad (Manual - Pacer) English	Select other language	21330-000091
A10	1	3006190-202	Large Keypad (Advisory) English	Select other language	21330-000122
A10	1	3006190-238	Large Keypad (Manual) English	Select other language	21330-000092
A12	1	804189-02	50 mm Printer [refer to Mfg Date Note]	100 mm Printer is optional	21300-002360
10	1	3006115-01	50 mm Printer Cover	100 mm Printer is optional	21300-001265
A12	1	3006229-02	100 mm Printer	Req'd for 12-Lead, EtCO2 or IP	21300-001277
158	1	3006241-00	Parameter Bezel Label – English	Select other language	21501-000025
162	1	3009058-042	Product ID Label (Monophasic) English	Select other language	21501-000065
162	1	3009058-050	Product ID Label (Biphasic) English	Select other language	21501-000068
164	1	3009059-00	Explosion/Hazard Label – English	Select other language	21501-000078

(Continued on next page)

ECG (No Options) *(continued)*

External Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
170	1	3009064-06	Operator Instruct. Label (Advisory - Pacer) English	Select other language	21501-000090
170	1	3009064-30	Operator Instruct. Label (Manual - Pacer) English	Select other language	21501-000108
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language	21501-000096
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language	21501-000114
178	1	3009790-00	50 mm Printer Screw Cover Label	100 mm Printer is optional	21501-000126
342	1	3012178-01	Exhaust Cover Label	No CO2	21501-000155
386	1	3012453-00	Label Spacer	No CO2	21501-000156
Ref.	1	3011371-074	Font/Voice System Software – English	Select other language	

ECG, Nellcor SpO2

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Qty	MIN	Part Description	Note	CAT.
A06	1	3008541-009	OEM PCB Assembly	OEM Assembly	21330-000149
A16	1	3008538-000	SpO2 Module	SpO2 Assembly	21300-001332
W21	1	3009700-00	SpO2 PCB/OEM PCB Cable	SpO2 Assembly	21330-000162
W22	1	3007993-003	SpO2 Cable Assembly	SpO2 Assembly	21330-000143
20	1	3012122-003	Lower Support Foam	RPL, Ref Kit 3011608-024	21300-001552
22	1	3012123-003	Upper Support Foam	RPL, Ref Kit 3011608-024	21300-001553
384	1	3012421-01	OEM PCB Shield	OEM Assembly	21300-001568
144	1	3009558-01	Option Shield	OEM Option	21300-001362
206	1	3007996-01	SpO2 Connector Gasket	SpO2 Assembly	21300-001313
226	1	3010805-000	10-pin Retainer Clip	SpO2 Assembly	21300-001416
228	2	3010805-001	14-pin Retainer Clip	SpO2 Assembly	21300-001417
234	2	202253-729	Nylock Screw, 2-56 × .312 L	SpO2 Assembly	21300-001036
384	1	3012421-01	OEM PCB Shield	OEM Assembly	21300-001568

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ECG, Nellcor SpO2 *(continued)*

External Parts

Item	Qty	MIN	Part Description	Note	CAT.
A09	1	3006189-00	Small Keypad (12-Lead) English	Select other language	21330-000044
A09	1	3006189-01	Small Keypad (3-lead) English	Select other language	21330-000045
A10	1	3006190-201	Large Keypad (Advisory - Pacer) English	Select other language	21330-000121
A10	1	3006190-237	Large Keypad (Manual - Pacer) English	Select other language	21330-000091
A10	1	3006190-202	Large Keypad (Advisory) English	Select other language	21330-000122
A10	1	3006190-238	Large Keypad (Manual) English	Select other language	21330-000092
A12	1	804189-02	50 mm Printer [refer to Mfg Date Note]	100 mm Printer is optional	21300-002360
10	1	3006115-01	50 mm Printer Cover	100 mm Printer is optional	21300-001265
A12	1	3006229-02	100 mm Printer	Req'd for 12-Lead, EtCO2 or IP	21300-001277
158	1	3006241-01	Parameter Bezel Label (Nellcor) – English	Select other language	21501-000026
162	1	3009058-042	Product ID Label (Monophasic) English	Select other language	21501-000065
162	1	3009058-050	Product ID Label (Biphasic) English	Select other language	21501-000068
164	1	3009059-00	Explosion/Hazard Label – English	Select other language	21501-000078

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ECG, Nellcor SpO2 *(continued)*

External Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
170	1	3009064-06	Operator Instruct. Label (Advisory - Pacer) English	Select other language	21501-000090
170	1	3009064-30	Operator Instruct. Label (Manual - Pacer) English	Select other language	21501-000108
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language	21501-000096
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language	21501-000114
178	1	3009790-00	50 mm Printer Screw Cover Label	100 mm Printer is optional	21501-000126
288	1	3011526-00	Oximeter Patent Label	SpO2 Assembly (Battery Well 1)	21501-000142
342	1	3012178-01	Exhaust Cover Label	No CO2	21501-000155
386	1	3012453-00	Label Spacer	No CO2	21501-000156
Ref.	1	3011371-074	Font/Voice System Software – English	Select other language	

ECG, Masimo SpO2

The specific parts for your device are listed in the following tables

Internal Parts

Item	Qty	MIN	Part Description	Note	CAT.
A06	1	3008541-009	OEM PCB Assembly	OEM Assembly	21330-000149
A16	1	3203421-001	Masimo SpO2 Module	Masimo SpO2 Assembly	21300-005730
W21	1	3203607-000	Masimo SpO2 PCB/OEM PCB Cable	Masimo SpO2 Assembly	21300-005728
W22	1	3203369-000	Masimo SpO2 Cable Assembly	Masimo SpO2 Assembly	21300-005729
20	1	3012122-003	Lower Support Foam	RPL, Ref Kit 3011608-024	21300-001552
22	1	3012123-003	Upper Support Foam	RPL, Ref Kit 3011608-024	21300-001553
144	1	3009558-002	Option Shield	OEM Option	21300-001362
228	1	3203920-000	Clip Retainer, AMP Connector	Masimo SpO2 Assembly	21300-006037
384	1	3012421-01	OEM PCB Shield	OEM Assembly	21300-001568
412	1	3203956-000	Housing -Ferrite, LIFEPAK 12	Masimo SpO2 Assembly	21300-006089
414	2	202253-760	Nylock Screw, 4-40 x .250 L	Masimo SpO2 Assembly	21300-006251
234	4	3205311-000	Pan Torx, Nylock Screw, 4-40 × .500 L	Masimo SpO2 Assembly	21300-006102

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ECG, Masimo SpO2 *(continued)*

External Parts

Item	Qty	MIN	Part Description	Note	CAT.
A09	1	3006189-00	Small Keypad (12-Lead) English	Select other language	21330-000044
A09	1	3006189-01	Small Keypad (3-lead) English	Select other language	21330-000045
A10	1	3006190-201	Large Keypad (Advisory - Pacer) English	Select other language	21330-000121
A10	1	3006190-237	Large Keypad (Manual - Pacer) English	Select other language	21330-000091
A10	1	3006190-202	Large Keypad (Advisory) English	Select other language	21330-000122
A10	1	3006190-238	Large Keypad (Manual) English	Select other language	21330-000092
A12	1	804189-02	50 mm Printer [refer to Mfg Date Note]	100 mm Printer is optional	21300-002360
10	1	3006115-01	50 mm Printer Cover	100 mm Printer is optional	21300-001265
A12	1	3006229-02	100 mm Printer	Req'd for 12-Lead, EtCO2 or IP	21300-001277
158	1	3006241-084	Parameter Bezel Label (Masimo) – English	Select other language	21501-001161
162	1	3009058-042	Product ID Label (Monophasic) English	Select other language	21501-000065
162	1	3009058-050	Product ID Label (Biphasic) English	Select other language	21501-000068
164	1	3009059-00	Explosion/Hazard Label – English	Select other language	21501-000078

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ECG, Masimo SpO2 *(continued)*

External Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
170	1	3009064-06	Operator Instruct. Label (Advisory - Pacer) English	Select other language	21501-000090
170	1	3009064-30	Operator Instruct. Label (Manual - Pacer) English	Select other language	21501-000108
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language	21501-000096
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language	21501-000114
178	1	3009790-00	50 mm Printer Screw Cover Label	100 mm Printer is optional	21501-000126
288	1	3011526-001	Masimo Patent Label	SpO2 Assembly (Battery Well 1)	21501-001156
342	1	3012178-01	Exhaust Cover Label	No CO2	21501-000155
386	1	3012453-00	Label Spacer	No CO2	21501-000156
Ref.	1	3011371-074	Font/Voice System Software – English	Select other language	

ECG, NIBP

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Qty	MIN	Part Description	Note	CAT.
A06	1	3008541-009	OEM PCB Assembly	OEM Assembly	21330-000149
A21	1	3008943-000	NIBP Module	NIBP Assembly	21300-001338
W27	1	3012181-00	NIBP/OEM PCB Cable	NIBP Assembly	21330-000235
20	1	3012122-003	Lower Support Foam	RPL, Ref Kit 3011608-024	21300-001552
22	1	3012123-003	Upper Support Foam	RPL, Ref Kit 3011608-024	21300-001553
378	1	3012180-02	Tubing	NIBP Assembly	21300-001560
380	1	3012333-001	Inline Fitting	NIBP Assembly	21300-001566
384	1	3012421-01	OEM PCB Shield	OEM Assembly	21300-001568

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ECG, NIBP *(continued)*

Internal Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
144	1	3009558-01	Option Shield	OEM Option	21300-001362
216	2	201508-000	Lock Nut, 4-40	NIBP Assembly	21300-000804
226	1	3010805-000	10-pin Retainer Clip	NIBP Assembly	21300-001416
251	2	200266-006	Hex Standoff, 4-40 × .375 × .250 L	NIBP Assembly	21300-000320
346	1	3012128-001	NIBP Air Connector	NIBP Assembly	21300-001555
348	1	3007999-01	NIBP Connector Seal	NIBP Assembly	21300-001316
378	1	3012180-02	Tubing	NIBP Assembly	21300-001560
380	1	3012333-001	Inline Fitting	NIBP Assembly	21300-001566
384	1	3012421-01	OEM PCB Shield	OEM Assembly	21300-001568

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ECG, NIBP *(continued)*

External Parts

Item	Qty	MIN	Part Description	Note	CAT.
A09	1	3006189-00	Small Keypad (12-Lead) English	Select other language	21330-000045
A09	1	3006189-01	Small Keypad (3-lead) English	Select other language	21330-000045
A10	1	3006190-200	Large Keypad (Advisory - Pacer) English	Select other language	21330-000120
A10	1	3006190-236	Large Keypad (Manual - Pacer) English	Select other language	21330-000090
A10	1	3006190-272	Large Keypad (Advisory) English	Select other language	21330-000107
A10	1	3006190-284	Large Keypad (Manual) English	Select other language	21330-000725
A12	1	804189-02	50 mm Printer [refer to Mfg Date Note]	100 mm Printer is optional	21300-002360
10	1	3006115-01	50 mm Printer Cover	100 mm Printer is optional	21300-001265
A12	1	3006229-02	100 mm Printer	Req'd for 12-Lead, EtCO2 or IP	21300-001277
158	1	3006241-35	Parameter Bezel Label (Nellcor Bezel) – English	Select other language	21501-000043
158	1	3006241-090	Parameter Bezel Label (Masimo Bezel) – English	Select other language	21501-001167
162	1	3009058-042	Product ID Label (Monophasic) English	Select other language	21501-000065
162	1	3009058-050	Product ID Label (Biphasic) English	Select other language	21501-000068
164	1	3009059-00	Explosion/Hazard Label – English	Select other language	21501-000078

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ECG, NIBP *(continued)*

External Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
170	1	3009064-06	Operator Instruct. Label (Advisory - Pacer) English	Select other language	21501-000090
170	1	3009064-30	Operator Instruct. Label (Manual - Pacer) English	Select other language	21501-000108
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language	21501-000096
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language	21501-000114
178	1	3009790-00	50 mm Printer Screw Cover Label	100 mm Printer is optional	21501-000126
342	1	3012178-01	Exhaust Cover Label	No CO2	21501-000155
386	1	3012453-00	Label Spacer	No CO2	21501-000156
Ref.	1	3011371-074	Font/Voice System Software – English	Select other language	

ECG, Nellcor SpO2, NIBP

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Qty	MIN	Part Description	Note	CAT.
A06	1	3008541-009	OEM PCB Assembly	OEM Assembly	21330-000149
A16	1	3008538-000	SpO2 Module	SpO2 Assembly	21300-001332
A21	1	3008943-000	NIBP Module	NIBP Assembly	21300-001338
W21	1	3009700-00	SpO2 PCB/OEM PCB Cable	SpO2 Assembly	21330-000162
W22	1	3007993-003	SpO2 Cable Assembly	SpO2 Assembly	21330-000143
W27	1	3012181-00	NIBP/OEM PCB Cable	NIBP Assembly	21330-000235
20	1	3012122-003	Lower Support Foam	RPL, Ref Kit 3011608-024	21300-001552
22	1	3012123-003	Upper Support Foam	RPL, Ref Kit 3011608-024	21300-001553

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ECG, Nellcor SpO2, NIBP *(continued)*

Internal Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
144	1	3009558-01	Option Shield	OEM Option	21300-001362
206	1	3007996-01	SpO2 Connector Gasket	SpO2 Assembly	21300-001313
216	2	201508-000	Lock Nut, 4-40	NIBP Assembly	21300-000804
226	2	3010805-000	10-pin Retainer Clip	NIBP and SpO2 Assemblies	21300-001416
228	2	3010805-001	14-pin Retainer Clip	SpO2 Assembly	21300-001417
234	2	202253-729	Nylock Screw, 2-56 × .312 L	SpO2 Assembly	21300-001036
251	2	200266-006	Hex Standoff, 4-40 × .375 × .250 L	NIBP Assembly	21300-000320
346	1	3012128-001	NIBP Air Connector	NIBP Assembly	21300-001555
348	1	3007999-01	NIBP Connector Seal	NIBP Assembly	21300-001316
378	1	3012180-02	Tubing	NIBP Assembly	21300-001560
380	1	3012333-001	Inline Fitting	NIBP Assembly	21300-001566
384	1	3012421-01	OEM PCB Shield	OEM Assembly	21300-001568

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ECG, Nellcor SpO2, NIBP *(continued)*

External Parts

Item	Qty	MIN	Part Description	Note	CAT.
A09	1	3006189-00	Small Keypad (12-Lead) English	Select other language	21330-000045
A09	1	3006189-01	Small Keypad (3-lead) English	Select other language	21330-000045
A10	1	3006190-200	Large Keypad (Advisory - Pacer) English	Select other language	21330-000120
A10	1	3006190-236	Large Keypad (Manual - Pacer) English	Select other language	21330-000090
A10	1	3006190-272	Large Keypad (Advisory) English	Select other language	21330-000107
A10	1	3006190-284	Large Keypad (Manual) English	Select other language	21330-000725
A12	1	804189-02	50 mm Printer [refer to Mfg Date Note]	100 mm Printer is optional	21300-002360
10	1	3006115-01	50 mm Printer Cover	100 mm Printer is optional	21300-001265
A12	1	3006229-02	100 mm Printer	Req'd for 12-Lead, EtCO2 or IP	21300-001277
158	1	3006241-17	Parameter Bezel Label (Nellcor) – English	Select other language	21501-000030
162	1	3009058-042	Product ID Label (Monophasic) English	Select other language	21501-000065
162	1	3009058-050	Product ID Label (Biphasic) English	Select other language	21501-000068
164	1	3009059-00	Explosion/Hazard Label – English	Select other language	21501-000078

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ECG, Nellcor SpO2, NIBP *(continued)*

External Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
170	1	3009064-06	Operator Instruct. Label (Advisory - Pacer) English	Select other language	21501-000090
170	1	3009064-30	Operator Instruct. Label (Manual - Pacer) English	Select other language	21501-000108
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language	21501-000096
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language	21501-000114
178	1	3009790-00	50 mm Printer Screw Cover Label	100 mm Printer is optional	21501-000126
288	1	3011526-00	Oximeter Patent Label	SpO2 Assembly (Battery Well 1)	21501-000142
342	1	3012178-01	Exhaust Cover Label	No CO2	21501-000155
386	1	3012453-00	Label Spacer	No CO2	21501-000156
Ref.	1	3011371-074	Font/Voice System Software – English	Select other language	

ECG, Masimo SpO2, NIBP

The specific parts for your device are listed in the following tables

Internal Parts

Item	Qty	MIN	Part Description	Note	CAT.
A06	1	3008541-009	OEM PCB Assembly	OEM Assembly	21330-000149
A16	1	3203421-001	Masimo SpO2 Module	Masimo SpO2 Assembly	21300-005730
A21	1	3008943-000	NIBP Module	NIBP Assembly	21300-001338
W21	1	3203607-000	Masimo SpO2 PCB/OEM PCB Cable	Masimo SpO2 Assembly	21300-005728
W22	1	3203369-000	Masimo SpO2 Cable Assembly	Masimo SpO2 Assembly	21300-005729
W27	1	3012181-00	NIBP/OEM PCB Cable	NIBP Assembly	21330-000235
20	1	3012122-003	Lower Support Foam	RPL, Ref Kit 3011608-024	21300-001552
22	1	3012123-003	Upper Support Foam	RPL, Ref Kit 3011608-024	21300-001553

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ECG, Masimo SpO2, NIBP *(continued)*

Internal Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
144	1	3009558-002	Option Shield	OEM Option	21300-001362
216	2	201508-000	Lock Nut, 4-40	NIBP Assembly	21300-000804
226	1	3010805-000	10-pin Retainer Clip	NIBP Assembly	21300-001416
228	1	3203920-000	Clip Retainer, AMP Connector	Masimo SpO2 Assembly	21300-006037
251	2	200266-006	Hex Standoff, 4-40 × .375 × .250 L	NIBP Assembly	21300-000320
346	1	3012128-001	NIBP Air Connector	NIBP Assembly	21300-001555
348	1	3007999-01	NIBP Connector Seal	NIBP Assembly	21300-001316
378	1	3012180-02	Tubing	NIBP Assembly	21300-001560
380	1	3012333-001	Inline Fitting	NIBP Assembly	21300-001566
384	1	3012421-01	OEM PCB Shield	OEM Assembly	21300-001568
412	1	3203956-000	Housing -Ferrite, LIFEPAK 12	Masimo SpO2 Assembly	21300-006089
414	2	202253-760	Nylock Screw, 4-40 x .250 L	Masimo SpO2 Assembly	21300-006251
234	4	3205311-000	Pan Torx, Nylock Screw, 4-40 × .500 L	Masimo SpO2 Assembly	21300-006102

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ECG, Masimo SpO2, NIBP *(continued)*

External Parts

Item	Qty	MIN	Part Description	Note	CAT.
A09	1	3006189-00	Small Keypad (12-Lead) English	Select other language	21330-000045
A09	1	3006189-01	Small Keypad (3-lead) English	Select other language	21330-000045
A10	1	3006190-200	Large Keypad (Advisory - Pacer) English	Select other language	21330-000120
A10	1	3006190-236	Large Keypad (Manual - Pacer) English	Select other language	21330-000090
A10	1	3006190-272	Large Keypad (Advisory) English	Select other language	21330-000107
A10	1	3006190-284	Large Keypad (Manual) English	Select other language	21330-000725
A12	1	804189-02	50 mm Printer [refer to Mfg Date Note]	100 mm Printer is optional	21300-002360
10	1	3006115-01	50 mm Printer Cover	100 mm Printer is optional	21300-001265
A12	1	3006229-02	100 mm Printer	Req'd for 12-Lead, EtCO2 or IP	21300-001277
158	1	3006241-086	Parameter Bezel Label (Masimo) – English	Select other language	21501-001163
162	1	3009058-042	Product ID Label (Monophasic) English	Select other language	21501-000065
162	1	3009058-050	Product ID Label (Biphasic) English	Select other language	21501-000068
164	1	3009059-00	Explosion/Hazard Label – English	Select other language	21501-000078

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ECG, Masimo SpO2, NIBP *(continued)*

External Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
170	1	3009064-06	Operator Instruct. Label (Advisory - Pacer) English	Select other language	21501-000090
170	1	3009064-30	Operator Instruct. Label (Manual - Pacer) English	Select other language	21501-000108
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language	21501-000096
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language	21501-000114
178	1	3009790-00	50 mm Printer Screw Cover Label	100 mm Printer is optional	21501-000126
288	1	3011526-001	Masimo Patent Label	SpO2 Assembly (Battery Well 1)	21501-001156
342	1	3012178-01	Exhaust Cover Label	No CO2	21501-000155
386	1	3012453-00	Label Spacer	No CO2	21501-000156
Ref.	1	3011371-074	Font/Voice System Software – English	Select other language	

ECG, EtCO2

The specific parts for your device are listed in the following tables

Internal Parts

Item	Qty	MIN	Part Description	Note	CAT.
A06	1	3008541-009	OEM PCB Assembly	OEM Assembly	21330-000149
A23	1	3012140-005	CO2 PCB Assembly	CO2 Assembly	21300-001558
W26	1	3012181-02	CO2/OEM PCB Cable	CO2 Assembly	21330-000236
W28	1	3012140-001	FRS Cable Assembly, CO2	CO2 Assembly	21300-001556
W30	1	3012397-01	CO2 Adapter Cable	CO2 Assembly	21330-000237
20	1	3012122-003	Lower Support Foam	RPL, Ref Kit 3011608-024	21300-001552
22	1	3012123-003	Upper Support Foam	RPL, Ref Kit 3011608-024	21300-001553

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ECG, EtCO2 *(continued)*

Internal Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
144	1	3009558-01	Option Shield	OEM Option	21300-001362
196	2	804447-21	Foam Spacer	CO2 Assembly with -04 EMI Shield	21300-002460
216	2	201508-000	Lock Nut, 4-40	CO2 Assembly	21300-000804
226	1	3010805-000	10-pin Retainer Clip	CO2 Assembly	21300-001416
230	2	202253-761	Nylock Screw, 4-40 × .312 L	CO2 Assembly	21300-001038
336	3	200804-102	Flat Washer, .312 od × .125 id	CO2 Assembly	21300-000580
354	1	3012119-02	CO2 Connector Adapter	CO2 Assembly	21300-001548
358	1	3012121-01	CO2 Connector Retainer	CO2 Assembly	21300-001551
360	1	3007997-01	CO2 Connector Seal	CO2 Assembly	21300-001314
370	1	3012125-01	Ground Strap	CO2 Assembly	21300-001554
376	4	202253-730	Nylock Screw, 2-56 × .375 L	CO2 Assembly	21300-001037
384	1	3012421-01	OEM PCB Shield	OEM Assembly	21300-001568
388	1	3012500-000	Tube Routing Clip	CO2 Assembly with -04 EMI Shield	21300-001570
392	1	3012140-002	CO2 Exhaust Tubing	CO2 Assembly	21300-001557

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ECG, EtCO2 *(continued)*

External Parts

Item	Qty	MIN	Part Description	Note	CAT.
A09	1	3006189-00	Small Keypad (12-Lead) English	Select other language	21330-000044
A09	1	3006189-01	Small Keypad (3-lead) English	Select other language	21330-000045
A10	1	3006190-201	Large Keypad (Advisory - Pacer) English	Select other language	21330-000121
A10	1	3006190-237	Large Keypad (Manual - Pacer) English	Select other language	21330-000091
A10	1	3006190-202	Large Keypad (Advisory) English	Select other language	21330-000122
A10	1	3006190-238	Large Keypad (Manual) English	Select other language	21330-000092
A12	1	3006229-02	100 mm Printer	Req'd for 12-Lead, EtCO2 or IP	21300-001277
158	1	3006241-45	Parameter Bezel Label – English	Select other language	21501-000049
162	1	3009058-042	Product ID Label (Monophasic) English	Select other language	21501-000065
162	1	3009058-050	Product ID Label (Biphasic) English	Select other language	21501-000068
164	1	3009059-00	Explosion/Hazard Label – English	Select other language	21501-000078

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ECG, EtCO2 *(continued)*

External Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
170	1	3009064-06	Operator Instruct. Label (Advisory - Pacer) English	Select other language	21501-000090
170	1	3009064-30	Operator Instruct. Label (Manual - Pacer) English	Select other language	21501-000108
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language	21501-000096
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language	21501-000114
342	1	3012178-00	CO2 Exhaust Label	CO2 Assembly	21501-000154
356	1	3012120-03	CO2 Connector Cover	CO2 Assembly	21300-001550
Ref.	1	3011371-074	Font/Voice System Software – English	Select other language	

ECG, Nellcor SpO2, EtCO2

The specific parts for your device are listed in the following tables

Internal Parts

Item	Qty	MIN	Part Description	Note	CAT.
A06	1	3008541-009	OEM PCB Assembly	OEM Assembly	21330-000149
A16	1	3008538-000	SpO2 Module	SpO2 Assembly	21300-001332
A23	1	3012140-005	CO2 PCB Assembly	CO2 Assembly	21300-001558
W21	1	3009700-00	SpO2 PCB/OEM PCB Cable	SpO2 Assembly	21330-000162
W22	1	3007993-003	SpO2 Cable Assembly	SpO2 Assembly	21330-000143
W26	1	3012181-02	CO2/OEM PCB Cable	CO2 Assembly	21330-000236
W28	1	3012140-001	FRS Cable Assembly, CO2	CO2 Assembly	21300-001556
W30	1	3012397-01	CO2 Adapter Cable	CO2 Assembly	21330-000237
20	1	3012122-003	Lower Support Foam	RPL, Ref Kit 3011608-024	21300-001552
22	1	3012123-003	Upper Support Foam	RPL, Ref Kit 3011608-024	21300-001553

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ECG, Nellcor SpO2, EtCO2 *(continued)*

Internal Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
144	1	3009558-01	Option Shield	OEM Option	21300-001362
196	2	804447-21	Foam Spacer	CO2 Assembly with -04 EMI Shield	21300-002460
206	1	3007996-01	SpO2 Connector Gasket	SpO2 Assembly	21300-001313
216	2	201508-000	Lock Nut, 4-40	CO2 Assembly	21300-000804
226	2	3010805-000	10-pin Retainer Clip	CO2 and SpO2 Assemblies	21300-001416
228	2	3010805-001	14-pin Retainer Clip	SpO2 Assembly	21300-001417
230	2	202253-761	Nylock Screw, 4-40 × .312 L	CO2 Assembly	21300-001038
234	2	202253-729	Nylock Screw, 2-56 × .312 L	SpO2 Assembly	21300-001036
336	3	200804-102	Flat Washer, .312 od × .125 id	CO2 Assembly	21300-000580
354	1	3012119-02	CO2 Connector Adapter	CO2 Assembly	21300-001548
358	1	3012121-01	CO2 Connector Retainer	CO2 Assembly	21300-001551

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ECG, Nellcor SpO2, EtCO2 *(continued)*

Internal Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
360	1	3007997-01	CO2 Connector Seal	CO2 Assembly	21300-001314
370	1	3012125-01	Ground Strap	CO2 Assembly	21300-001554
376	4	202253-730	Nylock Screw, 2-56 × .375 L	CO2 Assembly	21300-001037
384	1	3012421-01	OEM PCB Shield	OEM Assembly	21300-001568
388	1	3012500-000	Tube Routing Clip	CO2 Assembly with -04 EMI Shield	21300-001570
392	1	3012140-002	CO2 Exhaust Tubing	CO2 Assembly	21300-001557

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ECG, Nellcor SpO2, EtCO2 *(continued)*

External Parts

Item	Qty	MIN	Part Description	Note	CAT.
A09	1	3006189-00	Small Keypad (12-Lead) English	Select other language	21330-000044
A09	1	3006189-01	Small Keypad (3-lead) English	Select other language	21330-000045
A10	1	3006190-201	Large Keypad (Advisory - Pacer) English	Select other language	21330-000121
A10	1	3006190-237	Large Keypad (Manual - Pacer) English	Select other language	21330-000091
A10	1	3006190-202	Large Keypad (Advisory) English	Select other language	21330-000122
A10	1	3006190-238	Large Keypad (Manual) English	Select other language	21330-000092
A12	1	3006229-02	100 mm Printer	Req'd for 12-Lead, EtCO2 or IP	21300-001277
158	1	3006241-45	Parameter Bezel Label (Nellcor) – English	Select other language	21501-000049
162	1	3009058-042	Product ID Label (Monophasic) English	Select other language	21501-000065
162	1	3009058-050	Product ID Label (Biphasic) English	Select other language	21501-000068
164	1	3009059-00	Explosion/Hazard Label – English	Select other language	21501-000078

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ECG, Nellcor SpO2, EtCO2 *(continued)*

External Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
170	1	3009064-06	Operator Instruct. Label (Advisory - Pacer) English	Select other language	21501-000090
170	1	3009064-30	Operator Instruct. Label (Manual - Pacer) English	Select other language	21501-000108
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language	21501-000096
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language	21501-000114
288	1	3011526-00	Oximeter Patent Label	SpO2 Assembly (Battery Well 1)	21501-000142
342	1	3012178-00	CO2 Exhaust Label	CO2 Assembly	21501-000154
356	1	3012120-03	CO2 Connector Cover	CO2 Assembly	21300-001550
Ref.	1	3011371-074	Font/Voice System Software – English	Select other language	

ECG, Masimo SpO2, EtCO2

The specific parts for your device are listed in the following tables

Internal Parts

Item	Qty	MIN	Part Description	Note	CAT.
A06	1	3008541-009	OEM PCB Assembly	OEM Assembly	21330-000149
A16	1	3203421-001	Masimo SpO2 Module	Masimo SpO2 Assembly	21300-005730
A23	1	3012140-004	CO2 PCB Assembly	CO2 Assembly	21300-001558
W21	1	3203607-000	Masimo SpO2 PCB/OEM PCB Cable	Masimo SpO2 Assembly	21300-005728
W22	1	3203369-000	Masimo SpO2 Cable Assembly	Masimo SpO2 Assembly	21300-005729
W26	1	3012181-02	CO2/OEM PCB Cable	CO2 Assembly	21330-000236
W28	1	3012140-001	FRS Cable Assembly, CO2	CO2 Assembly	21300-001556
W30	1	3012397-01	CO2 Adapter Cable	CO2 Assembly	21330-000237
20	1	3012122-003	Lower Support Foam	RPL, Ref Kit 3011608-024	21300-001552
22	1	3012123-003	Upper Support Foam	RPL, Ref Kit 3011608-024	21300-001553

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ECG, Masimo SpO2, EtCO2 *(continued)*

Internal Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
144	1	3009558-002	Option Shield	OEM Option	21300-001362
216	2	201508-000	Lock Nut, 4-40	CO2 Assembly	21300-000804
226	1	3010805-000	10-pin Retainer Clip	CO2 Assembly	21300-001416
228	1	3203920-000	Clip Retainer, AMP Connector	Masimo SpO2 Assembly	21300-006037
230	2	202253-761	Nylock Screw, 4-40 × .312 L	CO2 Assembly	21300-001038
336	3	200804-102	Flat Washer, .312 od × .125 id	CO2 Assembly	21300-000580
354	1	3012119-02	CO2 Connector Adapter	CO2 Assembly	21300-001548
358	1	3012121-01	CO2 Connector Retainer	CO2 Assembly	21300-001551

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ECG, Masimo SpO2, EtCO2 *(continued)*

Internal Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
360	1	3007997-01	CO2 Connector Seal	CO2 Assembly	21300-001314
370	1	3012125-01	Ground Strap	CO2 Assembly	21300-001554
376	4	202253-730	Nylock Screw, 2-56 × .375 L	CO2 Assembly	21300-001037
384	1	3012421-01	OEM PCB Shield	OEM Assembly	21300-001568
392	1	3012140-002	CO2 Exhaust Tubing	CO2 Assembly	21300-001557
412	1	3203956-000	Housing -Ferrite, LIFEPAK 12	Masimo SpO2 Assembly	21300-006089
414	2	202253-760	Nylock Screw, 4-40 x .250 L	Masimo SpO2 Assembly	21300-006251
234	4	3205311-000	Pan Torx, Nylock Screw, 4-40 × .500 L	Masimo SpO2 Assembly	21300-006102

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ECG, Masimo SpO2, EtCO2 *(continued)*

External Parts

Item	Qty	MIN	Part Description	Note	CAT.
A09	1	3006189-00	Small Keypad (12-Lead) English	Select other language	21330-000044
A09	1	3006189-01	Small Keypad (3-lead) English	Select other language	21330-000045
A10	1	3006190-201	Large Keypad (Advisory - Pacer) English	Select other language	21330-000121
A10	1	3006190-237	Large Keypad (Manual - Pacer) English	Select other language	21330-000091
A10	1	3006190-202	Large Keypad (Advisory) English	Select other language	21330-000122
A10	1	3006190-238	Large Keypad (Manual) English	Select other language	21330-000092
A12	1	3006229-02	100 mm Printer	Req'd for 12-Lead, EtCO2 or IP	21300-001277
158	1	3006241-099	Parameter Bezel Label (Masimo) – English	Select other language	21501-001176
162	1	3009058-042	Product ID Label (Monophasic) English	Select other language	21501-000065
162	1	3009058-050	Product ID Label (Biphasic) English	Select other language	21501-000068
164	1	3009059-00	Explosion/Hazard Label – English	Select other language	21501-000078

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ECG, Masimo SpO2, EtCO2 *(continued)*

External Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
170	1	3009064-06	Operator Instruct. Label (Advisory - Pacer) English	Select other language	21501-000090
170	1	3009064-30	Operator Instruct. Label (Manual - Pacer) English	Select other language	21501-000108
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language	21501-000096
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language	21501-000114
288	1	3011526-001	Masimo Patent Label	SpO2 Assembly (Battery Well 1)	21501-001156
342	1	3012178-00	CO2 Exhaust Label	CO2 Assembly	21501-000154
356	1	3012120-03	CO2 Connector Cover	CO2 Assembly	21300-001550
Ref.	1	3011371-074	Font/Voice System Software – English	Select other language	

ECG, Nellcor SpO2, NIBP, EtCO2

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Qty	MIN	Part Description	Note	CAT.
A06	1	3008541-009	OEM PCB Assembly	OEM Assembly	21330-000149
A16	1	3008538-000	SpO2 Module	SpO2 Assembly	21300-001332
A21	1	3008943-000	NIBP Module	NIBP Assembly	21300-001338
A23	1	3012140-005	CO2 PCB Assembly	CO2 Assembly	21300-001558
W21	1	3009700-00	SpO2 PCB/OEM PCB Cable	SpO2 Assembly	21330-000162
W22	1	3007993-003	SpO2 Cable Assembly	SpO2 Assembly	21330-000143
W26	1	3012181-02	CO2/OEM PCB Cable	CO2 Assembly	21330-000236
W27	1	3012181-00	NIBP/OEM PCB Cable	NIBP Assembly	21330-000235
W28	1	3012140-001	FRS Cable Assembly, CO2	CO2 Assembly	21300-001556
W30	1	3012397-01	CO2 Adapter Cable	CO2 Assembly	21330-000237
20	1	3012122-003	Lower Support Foam	RPL, Ref Kit 3011608-024	21300-001552
22	1	3012123-003	Upper Support Foam	RPL, Ref Kit 3011608-024	21300-001553

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ECG, Nellcor SpO2, NIBP, EtCO2 *(continued)*

Internal Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
144	1	3009558-01	Option Shield	OEM Option	21300-001362
196	2	804447-21	Foam Spacer	CO2 Assembly with -04 EMI Shield	21300-002460
206	1	3007996-01	SpO2 Connector Gasket	SpO2 Assembly	21300-001313
216	4	201508-000	Lock Nut, 4-40	CO2 and NIBP Assemblies	21300-000804
226	3	3010805-000	10-pin Retainer Clip	CO2, NIBP and SpO2 Assemblies	21300-001416
228	2	3010805-001	14-pin Retainer Clip	SpO2 Assembly	21300-001417
230	2	202253-761	Nylock Screw, 4-40 × .312 L	CO2 Assembly	21300-001038
234	2	202253-729	Nylock Screw, 2-56 × .312 L	SpO2 Assembly	21300-001036
251	2	200266-006	Hex Standoff, 4-40 × .375 × .250 L	NIBP Assembly	21300-000320
336	3	200804-102	Flat Washer, .312 od × .125 id	CO2 Assembly	21300-000580
346	1	3012128-001	NIBP Air Connector	NIBP Assembly	21300-001555
348	1	3007999-01	NIBP Connector Seal	NIBP Assembly	21300-001316
354	1	3012119-02	CO2 Connector Adapter	CO2 Assembly	21300-001548
358	1	3012121-01	CO2 Connector Retainer	CO2 Assembly	21300-001551

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ECG, Nellcor SpO2, NIBP, EtCO2 *(continued)*

Internal Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
360	1	3007997-01	CO2 Connector Seal	CO2 Assembly	21300-001314
370	1	3012125-01	Ground Strap	CO2 Assembly	21300-001554
376	4	202253-730	Nylock Screw, 2-56 × .375 L	CO2 Assembly	21300-001037
378	1	3012180-02	Tubing	NIBP Assembly	21300-001560
380	1	3012333-001	Inline Fitting	NIBP Assembly	21300-001566
384	1	3012421-01	OEM PCB Shield	OEM Assembly	21300-001568
388	1	3012500-000	Tube Routing Clip	CO2 Assembly with -04 EMI Shield	21300-001570
392	1	3012140-002	CO2 Exhaust Tubing	CO2 Assembly	21300-001557

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ECG, Nellcor SpO2, NIBP, EtCO2 *(continued)*

External Parts

Item	Qty	MIN	Part Description	Note	CAT.
A09	1	3006189-00	Small Keypad (12-Lead) English	Select other language	21330-000045
A09	1	3006189-01	Small Keypad (3-lead) English	Select other language	21330-000045
A10	1	3006190-200	Large Keypad (Advisory - Pacer) English	Select other language	21330-000120
A10	1	3006190-236	Large Keypad (Manual - Pacer) English	Select other language	21330-000090
A10	1	3006190-272	Large Keypad (Advisory) English	Select other language	21330-000107
A10	1	3006190-284	Large Keypad (Manual) English	Select other language	21330-000725
A12	1	3006229-02	100 mm Printer	Req'd for 12-Lead, EtCO2 or IP	21300-001277
158	1	3006241-47	Parameter Bezel Label (Nellcor) – English	Select other language	21501-000051
162	1	3009058-042	Product ID Label (Monophasic) English	Select other language	21501-000065
162	1	3009058-050	Product ID Label (Biphasic) English	Select other language	21501-000068
164	1	3009059-00	Explosion/Hazard Label – English	Select other language	21501-000078

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ECG, Nellcor SpO2, NIBP, EtCO2 *(continued)*

External Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
170	1	3009064-06	Operator Instruct. Label (Advisory - Pacer) English	Select other language	21501-000090
170	1	3009064-30	Operator Instruct. Label (Manual - Pacer) English	Select other language	21501-000108
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language	21501-000096
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language	21501-000114
288	1	3011526-00	Oximeter Patent Label	SpO2 Assembly (Battery Well 1)	21501-000142
342	1	3012178-00	CO2 Exhaust Label	CO2 Assembly	21501-000154
356	1	3012120-03	CO2 Connector Cover	CO2 Assembly	21300-001550
Ref.	1	3011371-074	Font/Voice System Software – English	Select other language	

ECG, Masimo SpO2, NIBP, EtCO2

The specific parts for your device are listed in the following tables

Internal Parts

Item	Qty	MIN	Part Description	Note	CAT.
A06	1	3008541-009	OEM PCB Assembly	OEM Assembly	21330-000149
A16	1	3203421-001	Masimo SpO2 Module	Masimo SpO2 Assembly	21300-005730
A21	1	3008943-000	NIBP Module	NIBP Assembly	21300-001338
A23	1	3012140-004	CO2 PCB Assembly	CO2 Assembly	21300-001558
W21	1	3203607-000	Masimo SpO2 PCB/OEM PCB Cable	Masimo SpO2 Assembly	21300-005728
W22	1	3203369-000	Masimo SpO2 Cable Assembly	Masimo SpO2 Assembly	21300-005729
W26	1	3012181-02	CO2/OEM PCB Cable	CO2 Assembly	21330-000236
W27	1	3012181-00	NIBP/OEM PCB Cable	NIBP Assembly	21330-000235
W28	1	3012140-001	FRS Cable Assembly, CO2	CO2 Assembly	21300-001556
W30	1	3012397-01	CO2 Adapter Cable	CO2 Assembly	21330-000237
20	1	3012122-003	Lower Support Foam	RPL, Ref Kit 3011608-024	21300-001552
22	1	3012123-003	Upper Support Foam	RPL, Ref Kit 3011608-024	21300-001553

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ECG, Masimo SpO2, NIBP, EtCO2 *(continued)*

Internal Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
144	1	3009558-002	Option Shield	OEM Option	21300-001362
216	4	201508-000	Lock Nut, 4-40	CO2 and NIBP Assemblies	21300-000804
226	2	3010805-000	10-pin Retainer Clip	CO2 and NIBP Assemblies	21300-001416
228	1	3203920-000	Clip Retainer, AMP Connector	Masimo SpO2 Assembly	21300-006037
230	2	202253-761	Nylock Screw, 4-40 × .312 L	CO2 Assembly	21300-001038
251	2	200266-006	Hex Standoff, 4-40 × .375 × .250 L	NIBP Assembly	21300-000320
336	3	200804-102	Flat Washer, .312 od × .125 id	CO2 Assembly	21300-000580
346	1	3012128-001	NIBP Air Connector	NIBP Assembly	21300-001555
348	1	3007999-01	NIBP Connector Seal	NIBP Assembly	21300-001316
354	1	3012119-02	CO2 Connector Adapter	CO2 Assembly	21300-001548
358	1	3012121-01	CO2 Connector Retainer	CO2 Assembly	21300-001551

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ECG, Masimo SpO2, NIBP, EtCO2 *(continued)*

Internal Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
360	1	3007997-01	CO2 Connector Seal	CO2 Assembly	21300-001314
370	1	3012125-01	Ground Strap	CO2 Assembly	21300-001554
376	4	202253-730	Nylock Screw, 2-56 × .375 L	CO2 Assembly	21300-001037
378	1	3012180-02	Tubing	NIBP Assembly	21300-001560
380	1	3012333-001	Inline Fitting	NIBP Assembly	21300-001566
384	1	3012421-01	OEM PCB Shield	OEM Assembly	21300-001568
392	1	3012140-002	CO2 Exhaust Tubing	CO2 Assembly	21300-001557
412	1	3203956-000	Housing -Ferrite, LIFEPAK 12	Masimo SpO2 Assembly	21300-006089
414	2	202253-760	Nylock Screw, 4-40 x .250 L	Masimo SpO2 Assembly	21300-006251
234	4	3205311-000	Pan Torx, Nylock Screw, 4-40 × .500 L	Masimo SpO2 Assembly	21300-006102

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ECG, Masimo SpO2, NIBP, EtCO2 *(continued)*

External Parts

Item	Qty	MIN	Part Description	Note	CAT.
A09	1	3006189-00	Small Keypad (12-Lead) English	Select other language	21330-000045
A09	1	3006189-01	Small Keypad (3-lead) English	Select other language	21330-000045
A10	1	3006190-200	Large Keypad (Advisory - Pacer) English	Select other language	21330-000120
A10	1	3006190-236	Large Keypad (Manual - Pacer) English	Select other language	21330-000090
A10	1	3006190-272	Large Keypad (Advisory) English	Select other language	21330-000107
A10	1	3006190-284	Large Keypad (Manual) English	Select other language	21330-000725
A12	1	3006229-02	100 mm Printer	Req'd for 12-Lead, EtCO2 or IP	21300-001277
158	1	3006241-101	Parameter Bezel Label (Masimo) – English	Select other language	21501-001178
162	1	3009058-042	Product ID Label (Monophasic) English	Select other language	21501-000065
162	1	3009058-050	Product ID Label (Biphasic) English	Select other language	21501-000068
164	1	3009059-00	Explosion/Hazard Label – English	Select other language	21501-000078

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ECG, Masimo SpO2, NIBP, EtCO2 *(continued)*

External Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
170	1	3009064-06	Operator Instruct. Label (Advisory - Pacer) English	Select other language	21501-000090
170	1	3009064-30	Operator Instruct. Label (Manual - Pacer) English	Select other language	21501-000108
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language	21501-000096
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language	21501-000114
288	1	3011526-001	Masimo Patent Label	SpO2 Assembly (Battery Well 1)	21501-001156
342	1	3012178-00	CO2 Exhaust Label	CO2 Assembly	21501-000154
356	1	3012120-03	CO2 Connector Cover	CO2 Assembly	21300-001550
Ref.	1	3011371-074	Font/Voice System Software – English	Select other language	

ECG, NIBP, EtCO2

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Qty	MIN	Part Description	Note	CAT.
A06	1	3008541-009	OEM PCB Assembly	OEM Assembly	21330-000149
A21	1	3008943-000	NIBP Module	NIBP Assembly	21300-001338
A23	1	3012140-005	CO2 PCB Assembly	CO2 Assembly	21300-001558
W26	1	3012181-02	CO2/OEM PCB Cable	CO2 Assembly	21330-000236
W27	1	3012181-00	NIBP/OEM PCB Cable	NIBP Assembly	21330-000235
W28	1	3012140-001	FRS Cable Assembly, CO2	CO2 Assembly	21300-001556
W30	1	3012397-01	CO2 Adapter Cable	CO2 Assembly	21330-000237
20	1	3012122-003	Lower Support Foam	RPL, Ref Kit 3011608-024	21300-001552
22	1	3012123-003	Upper Support Foam	RPL, Ref Kit 3011608-024	21300-001553

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ECG, NIBP, EtCO2 *(continued)*

Internal Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
144	1	3009558-01	Option Shield	OEM Option	21300-001362
196	2	804447-21	Foam Spacer	CO2 Assembly with -04 EMI Shield	21300-002460
216	4	201508-000	Lock Nut, 4-40	CO2 and NIBP Assemblies	21300-000804
226	3	3010805-000	10-pin Retainer Clip	CO2 and NIBP Assemblies	21300-001416
230	2	202253-761	Nylock Screw, 4-40 × .312 L	CO2 Assembly	21300-001038
251	2	200266-006	Hex Standoff, 4-40 × .375 × .250 L	NIBP Assembly	21300-000320
336	3	200804-102	Flat Washer, .312 od × .125 id	CO2 Assembly	21300-000580
346	1	3012128-001	NIBP Air Connector	NIBP Assembly	21300-001555
348	1	3007999-01	NIBP Connector Seal	NIBP Assembly	21300-001316
354	1	3012119-02	CO2 Connector Adapter	CO2 Assembly	21300-001548
358	1	3012121-01	CO2 Connector Retainer	CO2 Assembly	21300-001551

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ECG, NIBP, EtCO2 *(continued)*

Internal Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
360	1	3007997-01	CO2 Connector Seal	CO2 Assembly	21300-001314
370	1	3012125-01	Ground Strap	CO2 Assembly	21300-001554
376	4	202253-730	Nylock Screw, 2-56 × .375 L	CO2 Assembly	21300-001037
378	1	3012180-02	Tubing	NIBP Assembly	21300-001560
380	1	3012333-001	Inline Fitting	NIBP Assembly	21300-001566
384	1	3012421-01	OEM PCB Shield	OEM Assembly	21300-001568
388	1	3012500-000	Tube Routing Clip	CO2 Assembly with -04 EMI Shield	21300-001570
392	1	3012140-002	CO2 Exhaust Tubing	CO2 Assembly	21300-001557

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ECG, NIBP, EtCO2 *(continued)*

External Parts

Item	Qty	MIN	Part Description	Note	CAT.
A09	1	3006189-00	Small Keypad (12-Lead) English	Select other language	21330-000044
A09	1	3006189-01	Small Keypad (3-lead) English	Select other language	21330-000045
A10	1	3006190-201	Large Keypad (Advisory - Pacer) English	Select other language	21330-000121
A10	1	3006190-237	Large Keypad (Manual - Pacer) English	Select other language	21330-000091
A10	1	3006190-202	Large Keypad (Advisory) English	Select other language	21330-000122
A10	1	3006190-238	Large Keypad (Manual) English	Select other language	21330-000092
A12	1	3006229-02	100 mm Printer	Req'd for 12-Lead, EtCO2 or IP	21300-001277
158	1	3006241-51	Parameter Bezel Label (Nellcor bezel) – English	Select other language	21501-000053
158	1	3006241-105	Parameter Bezel Label (Masimo bezel) – English	Select other language	21501-001187
162	1	3009058-042	Product ID Label (Monophasic) English	Select other language	21501-000065
162	1	3009058-050	Product ID Label (Biphasic) English	Select other language	21501-000068
164	1	3009059-00	Explosion/Hazard Label – English	Select other language	21501-000078

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ECG, NIBP, EtCO2 *(continued)*

External Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
170	1	3009064-06	Operator Instruct. Label (Advisory - Pacer) English	Select other language	21501-000090
170	1	3009064-30	Operator Instruct. Label (Manual - Pacer) English	Select other language	21501-000108
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language	21501-000096
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language	21501-000114
342	1	3012178-00	CO2 Exhaust Label	CO2 Assembly	21501-000154
356	1	3012120-03	CO2 Connector Cover	CO2 Assembly	21300-001550
Ref.	1	3011371-074	Font/Voice System Software – English	Select other language	

ECG, Nellcor SpO2, IP

The specific parts for your device are listed in the following tables.

Internal Parts

Item	Qty	MIN	Part Description	Note	CAT.
A06	1	3008541-009	OEM PCB Assembly	OEM Assembly	21330-000149
A16	1	3008538-000	SpO2 Module	SpO2 Assembly	21300-001332
W21	1	3009700-00	SpO2 PCB/OEM PCB Cable	SpO2 Assembly	21330-000162
W22	1	3007993-003	SpO2 Cable Assembly	SpO2 Assembly	21330-000143
W33	1	3200466-01	Invasive Pressure 1 & 2 Wire Harness	IP Assembly	21300-001583
20	1	3012122-003	Lower Support Foam	RPL, Ref Kit 3011608-024	21300-001552
22	1	3012123-003	Upper Support Foam	RPL, Ref Kit 3011608-024	21300-001553
144	1	3009558-01	Option Shield	OEM Option	21300-001362
206	1	3007996-01	SpO2 Connector Gasket	SpO2 Assembly	21300-001313
226	1	3010805-000	10-pin Retainer Clip	SpO2 Assembly	21300-001416
228	2	3010805-001	14-pin Retainer Clip	SpO2 Assembly	21300-001417
234	2	202253-729	Nylock Screw, 2-56 × .312 L	SpO2 Assembly	21300-001036
336	8	200804-102	Flat Washer, .312 od × .125 id	IP Assembly	21300-000580
384	1	3012421-01	OEM PCB Shield	OEM Assembly	21300-001568
406	2	3007998-00	Invasive Pressure Gasket	IP Assembly	21300-001315

ECG, Nellcor SpO2, IP *(continued)*

External Parts

Item	Qty	MIN	Part Description	Note	CAT.
A09	1	3006189-00	Small Keypad (12-Lead) English	Select other language	21330-000044
A09	1	3006189-01	Small Keypad (3-lead) English	Select other language	21330-000045
A10	1	3006190-201	Large Keypad (Advisory - Pacer) English	Select other language	21330-000121
A10	1	3006190-237	Large Keypad (Manual - Pacer) English	Select other language	21330-000091
A10	1	3006190-202	Large Keypad (Advisory) English	Select other language	21330-000122
A10	1	3006190-238	Large Keypad (Manual) English	Select other language	21330-000092
A12	1	3006229-02	100 mm Printer	Req'd for 12-Lead, EtCO2 or IP	21300-001277
158	1	3006241-65	Parameter Bezel Label (Nellcor) – English	Select other language	21501-001222
162	1	3009058-042	Product ID Label (Monophasic) English	Select other language	21501-000065
162	1	3009058-050	Product ID Label (Biphasic) English	Select other language	21501-000068
164	1	3009059-00	Explosion/Hazard Label – English	Select other language	21501-000078

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ECG, Nellcor SpO2, IP *(continued)*

External Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
170	1	3009064-06	Operator Instruct. Label (Advisory - Pacer) English	Select other language	21501-000090
170	1	3009064-30	Operator Instruct. Label (Manual - Pacer) English	Select other language	21501-000108
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language	21501-000096
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language	21501-000114
288	1	3011526-00	Oximeter Patent Label	SpO2 Assembly (Battery Well 1)	21501-000142
342	1	3012178-01	Exhaust Cover Label	No CO2	21501-000155
386	1	3012453-00	Label Spacer	No CO2	21501-000156
Ref.	1	3011371-074	Font/Voice System Software – English	Select other language	

ECG, Masimo SpO2, IP

The specific parts for your device are listed in the following tables

Internal Parts

Item	Qty	MIN	Part Description	Note	CAT.
A06	1	3008541-009	OEM PCB Assembly	OEM Assembly	21330-000149
A16	1	3203421-001	Masimo SpO2 Module	Masimo SpO2 Assembly	21300-005730
W21	1	3203607-000	Masimo SpO2 PCB/OEM PCB Cable	Masimo SpO2 Assembly	21300-005728
W22	1	3203369-000	Masimo SpO2 Cable Assembly	Masimo SpO2 Assembly	21300-005729
W33	1	3200466-01	Invasive Pressure 1 & 2 Wire Harness	IP Assembly	21300-001583
20	1	3012122-003	Lower Support Foam	RPL, Ref Kit 3011608-024	21300-001552
22	1	3012123-003	Upper Support Foam	RPL, Ref Kit 3011608-024	21300-001553
144	1	3009558-01	Option Shield	OEM Option	21300-001362
228	1	3203920-000	Clip Retainer, AMP Connector	Masimo SpO2 Assembly	21300-006037
230	8	202253-761	Nylock Screw, 4-40 × .312 L	IP Assembly	21300-001038
234	4	202253-764	Nylock Screw, 4-40 × .500 L	Masimo SpO2 Assembly	21300-004599
336	8	200804-102	Flat Washer, .312 od × .125 id	IP Assembly	21300-000580

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ECG, Masimo SpO2, IP *(continued)*

Internal Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
384	1	3012421-002	OEM PCB Shield	OEM Assembly	21300-001568
406	2	3007998-00	Invasive Pressure Gasket	IP Assembly	21300-001315
412	1	3203956-000	Housing -Ferrite, LIFEPAK 12	Masimo SpO2 Assembly	21300-006089
414	2	202253-760	Nylock Screw, 4-40 x .250 L	Masimo SpO2 Assembly	21300-006251
234	4	3205311-000	Pan Torx, Nylock Screw, 4-40 × .500 L	Masimo SpO2 Assembly	21300-006102

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ECG, Masimo SpO2, IP *(continued)*

External Parts

Item	Qty	MIN	Part Description	Note	CAT.
A09	1	3006189-00	Small Keypad (12-Lead) English	Select other language	21330-000044
A09	1	3006189-01	Small Keypad (3-lead) English	Select other language	21330-000045
A10	1	3006190-201	Large Keypad (Advisory - Pacer) English	Select other language	21330-000121
A10	1	3006190-237	Large Keypad (Manual - Pacer) English	Select other language	21330-000091
A10	1	3006190-202	Large Keypad (Advisory) English	Select other language	21330-000122
A10	1	3006190-238	Large Keypad (Manual) English	Select other language	21330-000092
A12	1	3006229-02	100 mm Printer	Req'd for 12-Lead, EtCO2 or IP	21300-001277
158	1	3006241-114	Parameter Bezel Label (Masimo) – English	Select other language	21501-001196
162	1	3009058-042	Product ID Label (Monophasic) English	Select other language	21501-000065
162	1	3009058-050	Product ID Label (Biphasic) English	Select other language	21501-000068
164	1	3009059-00	Explosion/Hazard Label – English	Select other language	21501-000078

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ECG, Masimo SpO2, IP *(continued)*

External Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
170	1	3009064-06	Operator Instruct. Label (Advisory - Pacer) English	Select other language	21501-000090
170	1	3009064-30	Operator Instruct. Label (Manual - Pacer) English	Select other language	21501-000108
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language	21501-000096
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language	21501-000114
288	1	3011526-001	Masimo Patent Label	SpO2 Assembly (Battery Well 1)	21501-001156
342	1	3012178-01	Exhaust Cover Label	No CO2	21501-000155
386	1	3012453-00	Label Spacer	No CO2	21501-000156
Ref.	1	3011371-074	Font/Voice System Software – English	Select other language	

ECG, NIBP, IP

The specific parts for your device are listed in the following tables

Internal Parts

Item	Qty	MIN	Part Description	Note	CAT.
A06	1	3008541-009	OEM PCB Assembly	OEM Assembly	21330-000149
A21	1	3008943-000	NIBP Module	NIBP Assembly	21300-001338
W27	1	3012181-00	NIBP/OEM PCB Cable	NIBP Assembly	21330-000235
W33	1	3200466-01	Invasive Pressure 1 & 2 Wire Harness	IP Assembly	21300-001583
20	1	3012122-003	Lower Support Foam	RPL, Ref Kit 3011608-024	21300-001552
22	1	3012123-003	Upper Support Foam	RPL, Ref Kit 3011608-024	21300-001553

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ECG, NIBP, IP *(continued)*

Internal Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
144	1	3009558-01	Option Shield	OEM Option	21300-001362
216	2	201508-000	Lock Nut, 4-40	NIBP Assembly	21300-000804
226	1	3010805-000	10-pin Retainer Clip	NIBP Assembly	21300-001416
230	8	202253-761	Nylock Screw, 4-40 × .312 L	IP Assembly	21300-001038
251	2	200266-006	Hex Standoff, 4-40 × .375 × .250 L	NIBP Assembly	21300-000320
336	8	200804-102	Flat Washer, .312 od × .125 id	IP Assembly	21300-000580
346	1	3012128-001	NIBP Air Connector	NIBP Assembly	21300-001555
348	1	3007999-01	NIBP Connector Seal	NIBP Assembly	21300-001316
378	1	3012180-02	Tubing	NIBP Assembly	21300-001560
380	1	3012333-001	Inline Fitting	NIBP Assembly	21300-001566
384	1	3012421-01	OEM PCB Shield	OEM Assembly	21300-001568
406	2	3007998-00	Invasive Pressure Gasket	IP Assembly	21300-001315

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ECG, NIBP, IP *(continued)*

External Parts

Item	Qty	MIN	Part Description	Note	CAT.
A09	1	3006189-00	Small Keypad (12-Lead) English	Select other language	21330-000045
A09	1	3006189-01	Small Keypad (3-lead) English	Select other language	21330-000045
A10	1	3006190-200	Large Keypad (Advisory - Pacer) English	Select other language	21330-000120
A10	1	3006190-236	Large Keypad (Manual - Pacer) English	Select other language	21330-000090
A10	1	3006190-272	Large Keypad (Advisory) English	Select other language	21330-000107
A10	1	3006190-284	Large Keypad (Manual) English	Select other language	21330-000725
A12	1	3006229-02	100 mm Printer	Req'd for 12-Lead, EtCO2 or IP	21300-001277
158	1	3006241-79	Parameter Bezel Label (Nellcor bezel) – English	Select other language	21501-001236
158	1	3006241-125	Parameter Bezel Label (Masimo bezel) – English	Select other language	21501-001209
162	1	3009058-042	Product ID Label (Monophasic) English	Select other language	21501-000065
162	1	3009058-050	Product ID Label (Biphasic) English	Select other language	21501-000068
164	1	3009059-00	Explosion/Hazard Label – English	Select other language	21501-000078

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ECG, NIBP, IP *(continued)*

External Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
170	1	3009064-06	Operator Instruct. Label (Advisory - Pacer) English	Select other language	21501-000090
170	1	3009064-30	Operator Instruct. Label (Manual - Pacer) English	Select other language	21501-000108
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language	21501-000096
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language	21501-000114
342	1	3012178-01	Exhaust Cover Label	No CO2	21501-000155
386	1	3012453-00	Label Spacer	No CO2	21501-000156
Ref.	1	3011371-074	Font/Voice System Software – English	Select other language	

ECG, Nellcor SpO2, NIBP, IP

The specific parts for your device are listed in the following tables

Internal Parts

Item	Qty	MIN	Part Description	Note	CAT.
A06	1	3008541-009	OEM PCB Assembly	OEM Assembly	21330-000149
A16	1	3008538-000	SpO2 Module	SpO2 Assembly	21300-001332
A21	1	3008943-000	NIBP Module	NIBP Assembly	21300-001338
W21	1	3009700-00	SpO2 PCB/OEM PCB Cable	SpO2 Assembly	21330-000162
W22	1	3007993-003	SpO2 Cable Assembly	SpO2 Assembly	21330-000143
W27	1	3012181-00	NIBP/OEM PCB Cable	NIBP Assembly	21330-000235
W33	1	3200466-01	Invasive Pressure 1 & 2 Wire Harness	IP Assembly	21300-001583
20	1	3012122-003	Lower Support Foam	RPL, Ref Kit 3011608-024	21300-001552
22	1	3012123-003	Upper Support Foam	RPL, Ref Kit 3011608-024	21300-001553

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ECG, Nellcor SpO2, NIBP, IP *(continued)*

Internal Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
144	1	3009558-01	Option Shield	OEM Option	21300-001362
206	1	3007996-01	SpO2 Connector Gasket	SpO2 Assembly	21300-001313
216	2	201508-000	Lock Nut, 4-40	NIBP Assembly	21300-000804
226	2	3010805-000	10-pin Retainer Clip	NIBP and SpO2 Assemblies	21300-001416
228	2	3010805-001	14-pin Retainer Clip	SpO2 Assembly	21300-001417
230	8	202253-761	Nylock Screw, 4-40 × .312 L	IP Assembly	21300-001038
234	2	202253-729	Nylock Screw, 2-56 × .312 L	SpO2 Assembly	21300-001036
251	2	200266-006	Hex Standoff, 4-40 × .375 × .250 L	NIBP Assembly	21300-000320
336	8	200804-102	Flat Washer, .312 od × .125 id	IP Assembly	21300-000580
346	1	3012128-001	NIBP Air Connector	NIBP Assembly	21300-001555
348	1	3007999-01	NIBP Connector Seal	NIBP Assembly	21300-001316
378	1	3012180-02	Tubing	NIBP Assembly	21300-001560
380	1	3012333-001	Inline Fitting	NIBP Assembly	21300-001566
384	1	3012421-01	OEM PCB Shield	OEM Assembly	21300-001568
406	2	3007998-00	Invasive Pressure Gasket	IP Assembly	21300-001315

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ECG, Nellcor SpO2, NIBP, IP *(continued)*

External Parts

Item	Qty	MIN	Part Description	Note	CAT.
A09	1	3006189-00	Small Keypad (12-Lead) English	Select other language	21330-000045
A09	1	3006189-01	Small Keypad (3-lead) English	Select other language	21330-000045
A10	1	3006190-200	Large Keypad (Advisory - Pacer) English	Select other language	21330-000120
A10	1	3006190-236	Large Keypad (Manual - Pacer) English	Select other language	21330-000090
A10	1	3006190-272	Large Keypad (Advisory) English	Select other language	21330-000107
A10	1	3006190-284	Large Keypad (Manual) English	Select other language	21330-000725
A12	1	3006229-02	100 mm Printer	Req'd for 12-Lead, EtCO2 or IP	21300-001277
158	1	3006241-57	Parameter Bezel Label (Nellcor) – English	Select other language	21501-000556
162	1	3009058-042	Product ID Label (Monophasic) English	Select other language	21501-000065
162	1	3009058-050	Product ID Label (Biphasic) English	Select other language	21501-000068
164	1	3009059-00	Explosion/Hazard Label – English	Select other language	21501-000078

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ECG, Nellcor SpO2, NIBP, IP *(continued)*

External Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
170	1	3009064-06	Operator Instruct. Label (Advisory - Pacer) English	**Select other language**	21501-000090
170	1	3009064-30	Operator Instruct. Label (Manual - Pacer) English	**Select other language**	21501-000108
170	1	3009064-12	Operator Instruct. Label (Advisory) English	**Select other language**	21501-000096
170	1	3009064-42	Operator Instruct. Label (Manual) English	**Select other language**	21501-000114
288	1	3011526-00	Oximeter Patent Label	SpO2 Assembly (Battery Well 1)	21501-000142
342	1	3012178-01	Exhaust Cover Label	No CO2	21501-000155
386	1	3012453-00	Label Spacer	No CO2	21501-000156
Ref.	1	3011371-074	Font/Voice System Software – English	**Select other language**	

ECG, Masimo SpO2, NIBP, IP

The specific parts for your device are listed in the following tables

Internal Parts

Item	Qty	MIN	Part Description	Note	CAT.
A06	1	3008541-009	OEM PCB Assembly	OEM Assembly	21330-000149
A16	1	3203421-001	Masimo SpO2 Module	Masimo SpO2 Assembly	21300-005730
A21	1	3008943-000	NIBP Module	NIBP Assembly	21300-001338
W21	1	3203607-000	Masimo SpO2 PCB/OEM PCB Cable	Masimo SpO2 Assembly	21300-005728
W22	1	3203369-000	Masimo SpO2 Cable Assembly	Masimo SpO2 Assembly	21300-005729
W27	1	3012181-00	NIBP/OEM PCB Cable	NIBP Assembly	21330-000235
W33	1	3200466-01	Invasive Pressure 1 & 2 Wire Harness	IP Assembly	21300-001583
20	1	3012122-003	Lower Support Foam	RPL, Ref Kit 3011608-024	21300-001552
22	1	3012123-003	Upper Support Foam	RPL, Ref Kit 3011608-024	21300-001553

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ECG, Masimo SpO2, NIBP, IP *(continued)*

Internal Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
144	1	3009558-002	Option Shield	OEM Option	21300-001362
216	2	201508-000	Lock Nut, 4-40	NIBP Assembly	21300-000804
226	1	3010805-000	10-pin Retainer Clip	NIBP Assembly	21300-001416
228	1	3203920-000	Clip Retainer, AMP Connector	Masimo SpO2 Assembly	21300-006037
230	8	202253-761	Nylock Screw, 4-40 × .312 L	IP Assembly	21300-001038
251	2	200266-006	Hex Standoff, 4-40 × .375 × .250 L	NIBP Assembly	21300-000320
336	8	200804-102	Flat Washer, .312 od × .125 id	IP Assembly	21300-000580
346	1	3012128-001	NIBP Air Connector	NIBP Assembly	21300-001555
348	1	3007999-01	NIBP Connector Seal	NIBP Assembly	21300-001316

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ECG, Masimo SpO2, NIBP, IP *(continued)*

Internal Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
378	1	3012180-02	Tubing	NIBP Assembly	21300-001560
380	1	3012333-001	Inline Fitting	NIBP Assembly	21300-001566
384	1	3012421-01	OEM PCB Shield	OEM Assembly	21300-001568
406	2	3007998-00	Invasive Pressure Gasket	IP Assembly	21300-001315
412	1	3203956-000	Housing -Ferrite, LIFEPAK 12	Masimo SpO2 Assembly	21300-006089
414	2	202253-760	Nylock Screw, 4-40 x .250 L	Masimo SpO2 Assembly	21300-006251
234	4	3205311-000	Pan Torx, Nylock Screw, 4-40 × .500 L	Masimo SpO2 Assembly	21300-006102

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ECG, Masimo SpO2, NIBP, IP *(continued)*

External Parts

Item	Qty	MIN	Part Description	Note	CAT.
A09	1	3006189-00	Small Keypad (12-Lead) English	Select other language	21330-000045
A09	1	3006189-01	Small Keypad (3-lead) English	Select other language	21330-000045
A10	1	3006190-200	Large Keypad (Advisory - Pacer) English	Select other language	21330-000120
A10	1	3006190-236	Large Keypad (Manual - Pacer) English	Select other language	21330-000090
A10	1	3006190-272	Large Keypad (Advisory) English	Select other language	21330-000107
A10	1	3006190-284	Large Keypad (Manual) English	Select other language	21330-000725
A12	1	3006229-02	100 mm Printer	Req'd for 12-Lead, EtCO2 or IP	21300-001277
158	1	3006241-109	Parameter Bezel Label (Masimo) – English	Select other language	21501-001191
162	1	3009058-042	Product ID Label (Monophasic) English	Select other language	21501-000065
162	1	3009058-050	Product ID Label (Biphasic) English	Select other language	21501-000068
164	1	3009059-00	Explosion/Hazard Label – English	Select other language	21501-000078

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ECG, Masimo SpO2, NIBP, IP *(continued)*

External Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
170	1	3009064-06	Operator Instruct. Label (Advisory - Pacer) English	Select other language	21501-000090
170	1	3009064-30	Operator Instruct. Label (Manual - Pacer) English	Select other language	21501-000108
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language	21501-000096
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language	21501-000114
288	1	3011526-001	Masimo Patent Label	SpO2 Assembly (Battery Well 1)	21501-001156
342	1	3012178-01	Exhaust Cover Label	No CO2	21501-000155
386	1	3012453-00	Label Spacer	No CO2	21501-000156
Ref.	1	3011371-074	Font/Voice System Software – English	Select other language	

ECG, Nellcor SpO2, NIBP, EtCO2, IP

The specific parts for your device are listed in the following tables

Internal Parts

Item	Qty	MIN	Part Description	Note	CAT.
A06	1	3008541-009	OEM PCB Assembly	OEM, View Component A06	21330-000149
A16	1	3008538-000	SpO2 Module	SpO2, View Component A16	21300-001332
A21	1	3008943-000	NIBP Module	NIBP, View Component A21	21300-001338
A23	1	3012140-005	CO2 PCB Assembly	CO2, View Component A23	21300-001558
W21	1	3009700-00	SpO2 PCB/OEM PCB Cable	SpO2 cable, View Component W21	21330-000162
W22	1	3007993-003	SpO2 Cable Assembly	SpO2 cable, View Component W22	21330-000143
W26	1	3012181-02	CO2/OEM PCB Cable	CO2 cable, View Component W26	21330-000236
W27	1	3012181-00	NIBP/OEM PCB Cable	NIBP cable, View Component W27	21330-000235
W28	1	3012140-001	FRS Cable Assembly, CO2	CO2 cable, View Component W28	21300-001556
W30	1	3012397-01	CO2 Adapter Cable	CO2 cable, View Component W30	21330-000237
W33	1	3200466-01	Invasive Pressure 1 & 2 Wire Harness	IP cable, View Component W33	21300-001583
20	1	3012122-003	Lower Support Foam	RPL, Ref Kit 3011608-024	21300-001552
22	1	3012123-003	Upper Support Foam	RPL, Ref Kit 3011608-024	21300-001553

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ECG, Nellcor SpO2, NIBP, EtCO2, IP *(continued)*

Internal Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
144	1	3009558-002	Option Shield	OEM Option	21300-001362
196	2	804447-21	Foam Spacer	CO2 Assembly with -04 EMI Shield	21300-002460
206	1	3007996-01	SpO2 Connector Gasket	SpO2 Assembly	21300-001313
216	4	201508-000	Lock Nut, 4-40	CO2 and NIBP Assemblies	21300-000804
226	3	3010805-000	10-pin Retainer Clip	CO2, NIBP and SpO2 Assemblies	21300-001416
228	2	3010805-001	14-pin Retainer Clip	SpO2 Assembly	21300-001417
230	10	202253-761	Nylock Screw, 4-40 × .312 L	CO2 and IP Assemblies	21300-001038
234	2	202253-729	Nylock Screw, 2-56 × .312 L	SpO2 Assembly	21300-001036
251	2	200266-006	Hex Standoff, 4-40 × .375 × .250 L	NIBP Assembly	21300-000320
336	11	200804-102	Flat Washer, .312 od × .125 id	CO2 and IP Assemblies	21300-000580
346	1	3012128-001	NIBP Air Connector	NIBP Assembly	21300-001555
348	1	3007999-01	NIBP Connector Seal	NIBP Assembly	21300-001316
354	1	3012119-02	CO2 Connector Adapter	CO2 Assembly	21300-001548
358	1	3012121-01	CO2 Connector Retainer	CO2 Assembly	21300-001551

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ECG, Nellcor SpO2, NIBP, EtCO2, IP *(continued)*

Internal Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
360	1	3007997-01	CO2 Connector Seal	CO2 Assembly	21300-001314
370	1	3012125-01	Ground Strap	CO2 Assembly	21300-001554
376	4	202253-730	Nylock Screw, 2-56 × .375 L	CO2 Assembly	21300-001037
378	1	3012180-02	Tubing	NIBP Assembly	21300-001560
380	1	3012333-001	Inline Fitting	NIBP Assembly	21300-001566
384	1	3012421-01	OEM PCB Shield	OEM Assembly	21300-001568
388	1	3012500-000	Tube Routing Clip	CO2 Assembly with -04 EMI Shield	21300-001570
392	1	3012140-002	CO2 Exhaust Tubing	CO2 Assembly	21300-001557
406	2	3007998-00	Invasive Pressure Gasket	IP Assembly	21300-001315

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ECG, Nellcor SpO2, NIBP, EtCO2, IP *(continued)*

External Parts

Item	Qty	MIN	Part Description	Note	CAT.
A09	1	3006189-00	Small Keypad (12-Lead) English	Select other language	21330-000045
A09	1	3006189-01	Small Keypad (3-lead) English	Select other language	21330-000045
A10	1	3006190-200	Large Keypad (Advisory - Pacer) English	Select other language	21330-000120
A10	1	3006190-236	Large Keypad (Manual - Pacer) English	Select other language	21330-000090
A10	1	3006190-272	Large Keypad (Advisory) English	Select other language	21330-000107
A10	1	3006190-284	Large Keypad (Manual) English	Select other language	21330-000725
A12	1	3006229-02	100 mm Printer	Req'd for 12-Lead, EtCO2 or IP	21300-001277
158	1	3006241-40	Parameter Bezel Label (Nellcor) – English	Select other language	21501-000047
162	1	3009058-042	Product ID Label (Monophasic) English	Select other language	21501-000065
162	1	3009058-050	Product ID Label (Biphasic) English	Select other language	21501-000068
164	1	3009059-00	Explosion/Hazard Label – English	Select other language	21501-000078

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ECG, Nellcor SpO2, NIBP, EtCO2, IP *(continued)*

External Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
170	1	3009064-06	Operator Instruct. Label (Advisory - Pacer) English	Select other language	21501-000090
170	1	3009064-30	Operator Instruct. Label (Manual - Pacer) English	Select other language	21501-000108
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language	21501-000096
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language	21501-000114
288	1	3011526-00	Oximeter Patent Label (Nellcor)	SpO2 Assembly (Battery Well 1)	21501-000142
342	1	3012178-00	CO2 Exhaust Label	CO2 Assembly	21501-000154
356	1	3012120-03	CO2 Connector Cover	CO2 Assembly	21300-001550
Ref.	1	3011371-074	Font/Voice System Software – English	Select other language	

ECG, Masimo SpO2, NIBP, EtCO2, IP

The specific parts for your device are listed in the following tables

Internal Parts

Item	Qty	MIN	Part Description	Note	CAT.
A06	1	3008541-009	OEM PCB Assembly	OEM, View Component A06	21330-000149
A16	1	3203421-001	Masimo SpO2 Module	SpO2, View Component A16	21300-005730
A21	1	3008943-000	NIBP Module	NIBP, View Component A21	21300-001338
A23	1	3012140-004	CO2 PCB Assembly	CO2, View Component A23	21300-001558
W21	1	3203607-000	Masimo SpO2 PCB/OEM PCB Cable	SpO2 cable, View Component W21	21300-005728
W22	1	3203369-000	Masimo SpO2 Cable Assembly	SpO2 cable, View Component W22	21300-005729
W26	1	3012181-02	CO2/OEM PCB Cable	CO2 cable, View Component W26	21330-000236
W27	1	3012181-00	NIBP/OEM PCB Cable	NIBP cable, View Component W27	21330-000235
W28	1	3012140-001	FRS Cable Assembly, CO2	CO2 cable, View Component W28	21300-001556
W30	1	3012397-01	CO2 Adapter Cable	CO2 cable, View Component W30	21330-000237
W33	1	3200466-01	Invasive Pressure 1 & 2 Wire Harness	IP cable, View Component W33	21300-001583
20	1	3012122-003	Lower Support Foam	RPL, Ref Kit 3011608-024	21300-001552
22	1	3012123-003	Upper Support Foam	RPL, Ref Kit 3011608-024	21300-001553

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ECG, Masimo SpO2, NIBP, EtCO2, IP *(continued)*

Internal Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
144	1	3009558-002	Option Shield	OEM Option	21300-001362
216	4	201508-000	Lock Nut, 4-40	CO2 and NIBP Assemblies	21300-000804
226	2	3010805-000	10-pin Retainer Clip	CO2 and NIBP Assemblies	21300-001416
228	1	3203920-000	Clip Retainer, AMP Connector	Masimo SpO2 Assembly	21300-006037
230	10	202253-761	Nylock Screw, 4-40 × .312 L	CO2 and IP Assemblies	21300-001038
251	2	200266-006	Hex Standoff, 4-40 × .375 × .250 L	NIBP Assembly	21300-000320
336	15	200804-102	Flat Washer, .312 od × .125 id	CO2 and IP Assemblies	21300-000580
346	1	3012128-001	NIBP Air Connector	NIBP Assembly	21300-001555
348	1	3007999-01	NIBP Connector Seal	NIBP Assembly	21300-001316
354	1	3012119-02	CO2 Connector Adapter	CO2 Assembly	21300-001548
358	1	3012121-01	CO2 Connector Retainer	CO2 Assembly	21300-001551

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ECG, Masimo SpO2, NIBP, EtCO2, IP *(continued)*

Internal Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
360	1	3007997-01	CO2 Connector Seal	CO2 Assembly	21300-001314
370	1	3012125-01	Ground Strap	CO2 Assembly	21300-001554
376	4	202253-730	Nylock Screw, 2-56 × .375 L	CO2 Assembly	21300-001037
378	1	3012180-02	Tubing	NIBP Assembly	21300-001560
380	1	3012333-001	Inline Fitting	NIBP Assembly	21300-001566
384	1	3012421-01	OEM PCB Shield	OEM Assembly	21300-001568
392	1	3012140-002	CO2 Exhaust Tubing	CO2 Assembly	21300-001557
406	2	3007998-00	Invasive Pressure Gasket	IP Assembly	21300-001315
412	1	3203956-000	Housing -Ferrite, LIFEPAK 12	Masimo SpO2 Assembly	21300-006089
414	2	202253-760	Nylock Screw, 4-40 x .250 L	Masimo SpO2 Assembly	21300-006251
234	4	3205311-000	Pan Torx, Nylock Screw, 4-40 × .500 L	Masimo SpO2 Assembly	21300-006102

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ECG, Masimo SpO2, NIBP, EtCO2, IP *(continued)*

External Parts

Item	Qty	MIN	Part Description	Note	CAT.
A09	1	3006189-00	Small Keypad (12-Lead) English	Select other language	21330-000044
A09	1	3006189-01	Small Keypad (3-lead) English	Select other language	21330-000045
A10	1	3006190-200	Large Keypad (Advisory - Pacer) English	Select other language	21330-000120
A10	1	3006190-236	Large Keypad (Manual - Pacer) English	Select other language	21330-000090
A10	1	3006190-272	Large Keypad (Advisory) English	Select other language	21330-000107
A10	1	3006190-284	Large Keypad (Manual) English	Select other language	21330-000725
A12	1	3006229-02	100 mm Printer	Req'd for 12-Lead, EtCO2 or IP	21300-001277
158	1	3006241-094	Parameter Bezel Label (Masimo) – English	Select other language	21501-001171
162	1	3009058-042	Product ID Label (Monophasic) English	Select other language	21501-000065
162	1	3009058-050	Product ID Label (Biphasic) English	Select other language	21501-000068
164	1	3009059-00	Explosion/Hazard Label – English	Select other language	21501-000078

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ECG, Masimo SpO2, NIBP, EtCO2, IP *(continued)*

External Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
170	1	3009064-06	Operator Instruct. Label (Advisory - Pacer) English	Select other language	21501-000090
170	1	3009064-30	Operator Instruct. Label (Manual - Pacer) English	Select other language	21501-000108
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language	21501-000096
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language	21501-000114
288	1	3011526-001	Masimo Patent Label	SpO2 Assembly (Battery Well 1)	21501-001156
342	1	3012178-00	CO2 Exhaust Label	CO2 Assembly	21501-000154
356	1	3012120-03	CO2 Connector Cover	CO2 Assembly	21300-001550
Ref.	1	3011371-074	Font/Voice System Software – English	Select other language	

ECG, Nellcor SpO2, EtCO2, IP

The specific parts for your device are listed in the following tables

Internal Parts

Item	Qty	MIN	Part Description	Note	CAT.
A06	1	3008541-009	OEM PCB Assembly	OEM Assembly	21330-000149
A16	1	3008538-000	SpO2 Module	SpO2 Assembly	21300-001332
A23	1	3012140-005	CO2 PCB Assembly	CO2 Assembly	21300-001558
W21	1	3009700-00	SpO2 PCB/OEM PCB Cable	SpO2 Assembly	21330-000162
W22	1	3007993-003	SpO2 Cable Assembly	SpO2 Assembly	21330-000143
W26	1	3012181-02	CO2/OEM PCB Cable	CO2 Assembly	21330-000236
W28	1	3012140-001	FRS Cable Assembly, CO2	CO2 Assembly	21300-001556
W30	1	3012397-01	CO2 Adapter Cable	CO2 Assembly	21330-000237
W33	1	3200466-01	Invasive Pressure 1 & 2 Wire Harness	IP Assembly	21300-001583
20	1	3012122-003	Lower Support Foam	RPL, Ref Kit 3011608-024	21300-001552
22	1	3012123-003	Upper Support Foam	RPL, Ref Kit 3011608-024	21300-001553

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ECG, Nellcor SpO2, EtCO2, IP *(continued)*

Internal Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
144	1	3009558-01	Option Shield	OEM Option	21300-001362
196	2	804447-21	Foam Spacer	CO2 Assembly with -04 EMI Shield	21300-002460
206	1	3007996-01	SpO2 Connector Gasket	SpO2 Assembly	21300-001313
216	2	201508-000	Lock Nut, 4-40	CO2 Assembly	21300-000804
226	4	3010805-000	10-pin Retainer Clip	NIBP, CO2 and SpO2 Assemblies	21300-001416
228	2	3010805-001	14-pin Retainer Clip	SpO2 Assembly	21300-001417
230	10	202253-761	Nylock Screw, 4-40 × .312 L	CO2 and IP Assemblies	21300-001038
234	2	202253-729	Nylock Screw, 2-56 × .312 L	SpO2 Assembly	21300-001036
336	11	200804-102	Flat Washer, .312 od × .125 id	CO2 and IP Assemblies	21300-000580
354	1	3012119-02	CO2 Connector Adapter	CO2 Assembly	21300-001548
358	1	3012121-01	CO2 Connector Retainer	CO2 Assembly	21300-001551

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ECG, Nellcor SpO2, EtCO2, IP *(continued)*

Internal Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
360	1	3007997-01	CO2 Connector Seal	CO2 Assembly	21300-001314
370	1	3012125-01	Ground Strap	CO2 Assembly	21300-001554
376	4	202253-730	Nylock Screw, 2-56 × .375 L	CO2 Assembly	21300-001037
384	1	3012421-01	OEM PCB Shield	OEM Assembly	21300-001568
388	1	3012500-000	Tube Routing Clip	CO2 Assembly with -04 EMI Shield	21300-001570
392	1	3012140-002	CO2 Exhaust Tubing	CO2 Assembly	21300-001557
406	2	3007998-00	Invasive Pressure Gasket	IP Assembly	21300-001315

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ECG, Nellcor SpO2, EtCO2, IP *(continued)*

External Parts

Item	Qty	MIN	Part Description	Note	CAT.
A09	1	3006189-00	Small Keypad (12-Lead) English	Select other language	21330-000045
A09	1	3006189-01	Small Keypad (3-lead) English	Select other language	21330-000045
A10	1	3006190-201	Large Keypad (Advisory - Pacer) English	Select other language	21330-000121
A10	1	3006190-237	Large Keypad (Manual - Pacer) English	Select other language	21330-000091
A10	1	3006190-202	Large Keypad (Advisory) English	Select other language	21330-000122
A10	1	3006190-238	Large Keypad (Manual) English	Select other language	21330-000092
A12	1	3006229-02	100 mm Printer	Req'd for 12-Lead, EtCO2 or IP	21300-001277
158	1	3006241-68	Parameter Bezel Label (Nellcor) – English	Select other language	21501-001225
162	1	3009058-042	Product ID Label (Monophasic) English	Select other language	21501-000065
162	1	3009058-050	Product ID Label (Biphasic) English	Select other language	21501-000068
164	1	3009059-00	Explosion/Hazard Label – English	Select other language	21501-000078

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ECG, Nellcor SpO2, EtCO2, IP *(continued)*

External Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
170	1	3009064-06	Operator Instruct. Label (Advisory - Pacer) English	Select other language	21501-000090
170	1	3009064-30	Operator Instruct. Label (Manual - Pacer) English	Select other language	21501-000108
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language	21501-000096
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language	21501-000114
288	1	3011526-00	Oximeter Patent Label	SpO2 Assembly (Battery Well 1)	21501-000142
342	1	3012178-00	CO2 Exhaust Label	CO2 Assembly	21501-000154
356	1	3012120-03	CO2 Connector Cover	CO2 Assembly	21300-001550
Ref.	1	3011371-074	Font/Voice System Software – English	Select other language	

ECG, Masimo SpO2, EtCO2, IP

The specific parts for your device are listed in the following tables

Internal Parts

Item	Qty	MIN	Part Description	Note	CAT.
A06	1	3008541-009	OEM PCB Assembly	OEM Assembly	21330-000149
A16	1	3203421-001	Masimo SpO2 Module	Masimo SpO2 Assembly	21300-005730
A23	1	3012140-004	CO2 PCB Assembly	CO2 Assembly	21300-001558
W21	1	3203607-000	Masimo SpO2 PCB/OEM PCB Cable	Masimo SpO2 Assembly	21300-005728
W22	1	3203369-000	Masimo SpO2 Cable Assembly	Masimo SpO2 Assembly	21300-005729
W26	1	3012181-02	CO2/OEM PCB Cable	CO2 Assembly	21330-000236
W28	1	3012140-001	FRS Cable Assembly, CO2	CO2 Assembly	21300-001556
W30	1	3012397-01	CO2 Adapter Cable	CO2 Assembly	21330-000237
W33	1	3200466-01	Invasive Pressure 1 & 2 Wire Harness	IP Assembly	21300-001583
20	1	3012122-003	Lower Support Foam	RPL, Ref Kit 3011608-024	21300-001552
22	1	3012123-003	Upper Support Foam	RPL, Ref Kit 3011608-024	21300-001553

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ECG, Masimo SpO2, EtCO2, IP *(continued)*

Internal Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
144	1	3009558-002	Option Shield	OEM Option	21300-001362
216	2	201508-000	Lock Nut, 4-40	CO2 Assembly	21300-000804
226	3	3010805-000	10-pin Retainer Clip	NIBP and CO2 Assembies	21300-001416
228	1	3203920-000	Clip Retainer, AMP Connector	Masimo SpO2 Assembly	21300-006037
230	10	202253-761	Nylock Screw, 4-40 × .312 L	CO2 and IP Assemblies	21300-001038
336	11	200804-102	Flat Washer, .312 od × .125 id	CO2 and IP Assemblies	21300-000580
354	1	3012119-02	CO2 Connector Adapter	CO2 Assembly	21300-001548
358	1	3012121-01	CO2 Connector Retainer	CO2 Assembly	21300-001551

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ECG, Masimo SpO2, EtCO2, IP *(continued)*

Internal Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
360	1	3007997-01	CO2 Connector Seal	CO2 Assembly	21300-001314
370	1	3012125-01	Ground Strap	CO2 Assembly	21300-001554
376	4	202253-730	Nylock Screw, 2-56 × .375 L	CO2 Assembly	21300-001037
384	1	3012421-01	OEM PCB Shield	OEM Assembly	21300-001568
392	1	3012140-002	CO2 Exhaust Tubing	CO2 Assembly	21300-001557
406	2	3007998-00	Invasive Pressure Gasket	IP Assembly	21300-001315
412	1	3203956-000	Housing -Ferrite, LIFEPAK 12	Masimo SpO2 Assembly	21300-006089
414	2	202253-760	Nylock Screw, 4-40 x .250 L	Masimo SpO2 Assembly	21300-006251
234	4	3205311-000	Pan Torx, Nylock Screw, 4-40 × .500 L	Masimo SpO2 Assembly	21300-006102

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ECG, Masimo SpO2, EtCO2, IP *(continued)*

External Parts

Item	Qty	MIN	Part Description	Note	CAT.
A09	1	3006189-00	Small Keypad (12-Lead) English	Select other language	21330-000044
A09	1	3006189-01	Small Keypad (3-lead) English	Select other language	21330-000045
A10	1	3006190-201	Large Keypad (Advisory - Pacer) English	Select other language	21330-000121
A10	1	3006190-237	Large Keypad (Manual - Pacer) English	Select other language	21330-000091
A10	1	3006190-202	Large Keypad (Advisory) English	Select other language	21330-000122
A10	1	3006190-238	Large Keypad (Manual) English	Select other language	21330-000092
A12	1	3006229-02	100 mm Printer	Req'd for 12-Lead, EtCO2 or IP	21300-001277
158	1	3006241-117	Parameter Bezel Label (Masimo) – English	Select other language	21501-001199
162	1	3009058-042	Product ID Label (Monophasic) English	Select other language	21501-000065
162	1	3009058-050	Product ID Label (Biphasic) English	Select other language	21501-000068
164	1	3009059-00	Explosion/Hazard Label – English	Select other language	21501-000078

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ECG, Masimo SpO2, EtCO2, IP *(continued)*

External Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
170	1	3009064-06	Operator Instruct. Label (Advisory - Pacer) English	Select other language	21501-000090
170	1	3009064-30	Operator Instruct. Label (Manual - Pacer) English	Select other language	21501-000108
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language	21501-000096
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language	21501-000114
288	1	3011526-001	Masimo Patent Label	SpO2 Assembly (Battery Well 1)	21501-001156
342	1	3012178-00	CO2 Exhaust Label	CO2 Assembly	21501-000154
356	1	3012120-03	CO2 Connector Cover	CO2 Assembly	21300-001550
Ref.	1	3011371-074	Font/Voice System Software – English	Select other language	

ECG, NIBP, EtCO2, IP

The specific parts for your device are listed in the following tables

Internal Parts

Item	Qty	MIN	Part Description	Note	CAT.
A06	1	3008541-009	OEM PCB Assembly	OEM Assembly	21330-000149
A21	1	3008943-000	NIBP Module	NIBP Assembly	21300-001338
A23	1	3012140-005	CO2 PCB Assembly	CO2 Assembly	21300-001558
W26	1	3012181-02	CO2/OEM PCB Cable	CO2 Assembly	21330-000236
W27	1	3012181-00	NIBP/OEM PCB Cable	NIBP Assembly	21330-000235
W28	1	3012140-001	FRS Cable Assembly, CO2	CO2 Assembly	21300-001556
W30	1	3012397-01	CO2 Adapter Cable	CO2 Assembly	21330-000237
W33	1	3200466-01	Invasive Pressure 1 & 2 Wire Harness	IP Assembly	21300-001583
20	1	3012122-003	Lower Support Foam	RPL, Ref Kit 3011608-024	21300-001552
22	1	3012123-003	Upper Support Foam	RPL, Ref Kit 3011608-024	21300-001553

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ECG, NIBP, EtCO2, IP *(continued)*

Internal Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
144	1	3009558-01	Option Shield	OEM Option	21300-001362
196	2	804447-21	Foam Spacer	CO2 Assembly with -04 EMI Shield	21300-002460
216	4	201508-000	Lock Nut, 4-40	CO2 and NIBP Assemblies	21300-000804
226	2	3010805-000	10-pin Retainer Clip	CO2, NIBP Assemblies	21300-001416
230	10	202253-761	Nylock Screw, 4-40 × .312 L	CO2 and IP Assemblies	21300-001038
251	2	200266-006	Hex Standoff, 4-40 × .375 × .250 L	NIBP Assembly	21300-000320
336	11	200804-102	Flat Washer, .312 od × .125 id	CO2 and IP Assemblies	21300-000580
346	1	3012128-001	NIBP Air Connector	NIBP Assembly	21300-001555
348	1	3007999-01	NIBP Connector Seal	NIBP Assembly	21300-001316
354	1	3012119-02	CO2 Connector Adapter	CO2 Assembly	21300-001548
358	1	3012121-01	CO2 Connector Retainer	CO2 Assembly	21300-001551

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ECG, NIBP, EtCO2, IP *(continued)*

Internal Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
360	1	3007997-01	CO2 Connector Seal	CO2 Assembly	21300-001314
370	1	3012125-01	Ground Strap	CO2 Assembly	21300-001554
376	4	202253-730	Nylock Screw, 2-56 × .375 L	CO2 Assembly	21300-001037
378	1	3012180-02	Tubing	NIBP Assembly	21300-001560
380	1	3012333-001	Inline Fitting	NIBP Assembly	21300-001566
384	1	3012421-01	OEM PCB Shield	OEM Assembly	21300-001568
388	1	3012500-000	Tube Routing Clip	CO2 Assembly with -04 EMI Shield	21300-001570
392	1	3012140-002	CO2 Exhaust Tubing	CO2 Assembly	21300-001557
406	2	3007998-00	Invasive Pressure Gasket	IP Assembly	21300-001315

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ECG, NIBP, EtCO2, IP *(continued)*

External Parts

Item	Qty	MIN	Part Description	Note	CAT.
A09	1	3006189-00	Small Keypad (12-Lead) English	Select other language	21330-000045
A09	1	3006189-01	Small Keypad (3-lead) English	Select other language	21330-000045
A10	1	3006190-200	Large Keypad (Advisory - Pacer) English	Select other language	21330-000120
A10	1	3006190-236	Large Keypad (Manual - Pacer) English	Select other language	21330-000090
A10	1	3006190-272	Large Keypad (Advisory) English	Select other language	21330-000107
A10	1	3006190-284	Large Keypad (Manual) English	Select other language	21330-000725
A12	1	3006229-02	100 mm Printer	Req'd for 12-Lead, EtCO2 or IP	21300-001277
158	1	3006241-71	Parameter Bezel Label (Nellcor Bezel) – English	Select other language	21501-001228
158	1	3006241-120	Parameter Bezel Label (Masimo Bezel) – English	Select other language	21501-001202
162	1	3009058-042	Product ID Label (Monophasic) English	Select other language	21501-000065
162	1	3009058-050	Product ID Label (Biphasic) English	Select other language	21501-000068
164	1	3009059-00	Explosion/Hazard Label – English	Select other language	21501-000078

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ECG, NIBP, EtCO2, IP *(continued)*

External Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
170	1	3009064-06	Operator Instruct. Label (Advisory - Pacer) English	Select other language	21501-000090
170	1	3009064-30	Operator Instruct. Label (Manual - Pacer) English	Select other language	21501-000108
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language	21501-000096
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language	21501-000114
342	1	3012178-00	CO2 Exhaust Label	CO2 Assembly	21501-000154
356	1	3012120-03	CO2 Connector Cover	CO2 Assembly	21300-001550
Ref.	1	3011371-074	Font/Voice System Software – English	Select other language	

ECG, EtCO2, IP

The specific parts for your device are listed in the following tables

Internal Parts

Item	Qty	MIN	Part Description	Note	CAT.
A06	1	3008541-009	OEM PCB Assembly	OEM Assembly	21330-000149
A23	1	3012140-005	CO2 PCB Assembly	CO2 Assembly	21300-001558
W26	1	3012181-02	CO2/OEM PCB Cable	CO2 Assembly	21330-000236
W28	1	3012140-001	FRS Cable Assembly, CO2	CO2 Assembly	21300-001556
W30	1	3012397-01	CO2 Adapter Cable	CO2 Assembly	21330-000237
W33	1	3200466-01	Invasive Pressure 1 & 2 Wire Harness	IP Assembly	21300-001583
20	1	3012122-003	Lower Support Foam	RPL, Ref Kit 3011608-024	21300-001552
22	1	3012123-003	Upper Support Foam	RPL, Ref Kit 3011608-024	21300-001553

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ECG, EtCO2, IP *(continued)*

Internal Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
144	1	3009558-01	Option Shield	OEM Option	21300-001362
196	2	804447-21	Foam Spacer	CO2 Assembly with -04 EMI Shield	21300-002460
216	2	201508-000	Lock Nut, 4-40	CO2 Assembly	21300-000804
226	1	3010805-000	10-pin Retainer Clip	CO2 Assembly	21300-001416
230	10	202253-761	Nylock Screw, 4-40 × .312 L	CO2 and IP Assemblies	21300-001038
336	11	200804-102	Flat Washer, .312 od × .125 id	CO2 and IP Assemblies	21300-000580
354	1	3012119-02	CO2 Connector Adapter	CO2 Assembly	21300-001548
358	1	3012121-01	CO2 Connector Retainer	CO2 Assembly	21300-001551
360	1	3007997-01	CO2 Connector Seal	CO2 Assembly	21300-001314
370	1	3012125-01	Ground Strap	CO2 Assembly	21300-001554
376	4	202253-730	Nylock Screw, 2-56 × .375 L	CO2 Assembly	21300-001037
384	1	3012421-01	OEM PCB Shield	OEM Assembly	21300-001568
388	1	3012500-000	Tube Routing Clip	CO2 Assembly with -04 EMI Shield	21300-001570
392	1	3012140-002	CO2 Exhaust Tubing	CO2 Assembly	21300-001557
406	2	3007998-00	Invasive Pressure Gasket	IP Assembly	21300-001315

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ECG, EtCO2, IP *(continued)*

External Parts

Item	Qty	MIN	Part Description	Note	CAT.
A09	1	3006189-00	Small Keypad (12-Lead) English	Select other language	21330-000045
A09	1	3006189-01	Small Keypad (3-lead) English	Select other language	21330-000045
A10	1	3006190-201	Large Keypad (Advisory - Pacer) English	Select other language	21330-000121
A10	1	3006190-237	Large Keypad (Manual - Pacer) English	Select other language	21330-000091
A10	1	3006190-202	Large Keypad (Advisory) English	Select other language	21330-000122
A10	1	3006190-238	Large Keypad (Manual) English	Select other language	21330-000092
A12	1	3006229-02	100 mm Printer	Req'd for 12-Lead, EtCO2 or IP	21300-001277
158	1	3006241-76	Parameter Bezel Label – English	Select other language	21501-001233
162	1	3009058-042	Product ID Label (Monophasic) English	Select other language	21501-000065
162	1	3009058-050	Product ID Label (Biphasic) English	Select other language	21501-000068
164	1	3009059-00	Explosion/Hazard Label – English	Select other language	21501-000078

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ECG, EtCO2, IP *(continued)*

External Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
170	1	3009064-06	Operator Instruct. Label (Advisory - Pacer) English	Select other language	21501-000090
170	1	3009064-30	Operator Instruct. Label (Manual - Pacer) English	Select other language	21501-000108
170	1	3009064-12	Operator Instruct. Label (Advisory) English	Select other language	21501-000096
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language	21501-000114
342	1	3012178-00	CO2 Exhaust Label	CO2 Assembly	21501-000154
356	1	3012120-03	CO2 Connector Cover	CO2 Assembly	21300-001550
Ref.	1	3011371-074	Font/Voice System Software – English	Select other language	

Front Case Parts

Common Front Case Parts

Item	Qty	MIN	Part Description	Note	CAT.
A05	1	3010524-04	Interface PCB	View Component A05	21330-000177
W04	1	3009677-01	System PCB/Interface PCB Cable	View Component W04	21330-000157
W11	1	3006216-004	Therapy Connector Cable	View Component W11	21330-000125
W15	1	3011128-002	Selector Assembly (with nut and washer)	View Component W15	21300-003713
W12	1	3009726-04	Small Keypad/Interface PCB Cable	View Component W12	21300-001372
W13	1	3009677-03	Large Keypad/Interface PCB Cable	View Component W13	21330-000158
W16	1	3009724-00	Printer Assembly/Interface PCB Cable	View Component W16	21330-000165
W17	1	3009726-03	Speaker Assembly	View Component W17	21300-001371
W19	1	3009726-01	Printer Assembly/Chassis Ground Cable	View Component W19	21300-001370
8	1	3006187-00	W15 Selector Assembly Knob		21300-001273
36	1	3009412-00	Front Panel Plug		21300-001352
50	1	3006810-01	Printer Assembly Connector Bracket		21300-006100
172	1	3009065-01	Medtronic Icon Label		21501-000121
190	1	3006245-00	Speaker Assembly Felt		21300-001282
204	1	3006809-00	Printer Connector Gasket		21300-001299

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Front Case Parts *(continued)*

Common Front Case Parts (continued)

Item	Qty	MIN	Part Description	Note	CAT.
218	1	200040-001	Therapy Connector Cable Snap Ring		21300-000149
230	15	202253-761	Nylock Screw, 4-40 x .312 L		21300-001038
232	3	201407-069	Nylock Screw, 6-32 x .375 L		21300-000777
238	1	3203445-000	Seal, Therapy Connector Mount		21300-005783
242	1	804234-03	Case Perimeter Seal		21300-002394
246	1	3012693-00	Speaker Assembly Hold-Down Spring		21300-001575

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Front Case Parts *(continued)*

EL Display Devices Only

The parts in the **Front Case Common Parts** list are common to all devices regardless of the options or language.

Item	Qty	MIN	Part Description	Note	CAT.
A11	1	3012695-000	EL Display Assembly	View Component A11	21300-001576
W32	1	3012736-00	Ribbon Cable Assembly, EL Display	View Component W32	21330-000240
2	1	3006113-06	Front Case		11220-000007
42	1	3012696-01	EL Display Bracket		21300-001577
212	1	3006186-008	EL Display Lens		21300-001299
336	4	200804-102	Washer		21300-000580
396	4	804447-17	Spacer Foam .50 x .50 x .75		21300-002456
410	1	804447-047	Spacer Foam Assembly, EL		21300-005376

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Front Case Parts *(continued)*

LCD Devices Only

The parts in the **Front Case Common Parts** list are common to all devices regardless of the options or language.

Item	Qty	MIN	Part Description	Note	CAT.
A08	1	3006806-00	Backlight PCB	View Component A08	21330-000673
A11	1	3010612-00	LCD Assembly	View Component A11	21300-001408
W06	1	3009702-00	Interface PCB/Backlight PCB Cable	View Component W06	21330-000164
W18	1	3009701-00	LCD Assembly/Interface PCB Cable	View Component W18	21330-000163
2	1	3006113-05	Front Case		11220-000006
6	4	3006183-02	Display Shock Mount		21300-001267
42	1	3006184-02	LCD Assembly Bracket		21300-001268
142	1	3009482-00	LCD Assembly Adhesive Shield		21300-001356
154	1	800943-09	International High Voltage Label		21501-000248
182	1	3009483-01	LCD Assembly Adhesive		21300-001357
188	1	201457-001	Adhesive Cable Tie Mount		21300-000787

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Front Case Parts *(continued)*

LCD Devices Only (continued)

Item	Qty	MIN	Part Description	Note	CAT.
212	1	3006186-04	LCD Lens		21300-001271
222	2	200536-001	Self-locking Cable Tie .10 W × 4.0 L		21300-000499
264	1	805613-00	ESD Shield Adhesive		21300-002675
280	1	201501-017	Adhesive Tape .75 W × .045 T		21300-000799
318	1	3011690-00	LIFEPAK 12 Display Label		21501-000143
400	2	3200412-00	Label-Shim, LIFEPAK 12 LCD Mounting		not available at this time

System/Memory/Therapy PCB Assembly Parts

The parts in the System/Memory/Therapy PCB Assembly (MIN 3006112-06 or 3006112-09) are common to devices as noted, regardless of options or language.

Item	Qty	MIN	Part Description	Note	CAT.
A01	1	3203010-000	System/Memory PCB assembly	View Component A01	21300-001061
A02	1	3008520-07	Memory PCB	replaces MIN 3008520-04, View Component A02	21330-000147
A04	1	3006235-012	Therapy PCB—Monophasic Devices	use repair kit 3011608-034, View Component A04	40998-000231
A04	1	3006235-014	Therapy PCB—Biphasic Devices	use repair kit 3011608-027, View Component A04	40998-000222
W03	1	3009878-002	System PCB/Therapy PCB Cable	View Component W03	21300-001379
12	1	3009347-03	System PCB CPU Shield		21300-001346
54	1	3009331-00	Therapy PCB, EMI Shield		21300-001343
56	1	3009345-00	System PCB, ECG Front, EMI Shield		21300-001344
58	1	3009346-00	System PCB, ECG Back Shield		21300-001345
146	1	3009642-02	System PCB/Therapy PCB Shield		21300-001365
196	1	804447-21	Foam Spacer	Used on Item 56	21300-002460
198	1	3010551-001	Reverse Bend Clip-On Contact		21300-001400
216	10	201508-000	Carbon Steel Lock Nut, 4-40 Thread		21300-000804

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System/Memory/Therapy PCB Assembly Parts *(continued)*

Item	Qty	MIN	Part Description	Note	CAT.
230	14	202253-761	Nylock Screw, 4-40 x .312 L		21300-001038
251	9	200266-006	Hex Standoff, 4-40 × .250 W × .375 L		21300-000320
290	1	804447-34	Adhesive Part, 1.0 W × 3.5 H × .250 T	Used on Item 12	21300-002464
292	2	3011630-00	PCB Spacer		21300-001479
294	1	3011629-00	Hex Insert		21300-001478
296	1	202253-550	Nylock Screw, 4-40 × 1.125 L		21300-001030
326	1	3011980-00	Shock Hazard Label	Biphasic Assembly	21501-000152
BT01	1	202305-000	Coin Battery (type CR2032)	Used on Item A01	21300-001052

Rear Case Common Parts, MIN 3006112-COM1

Item	Qty	MIN	Part Description	Note	CAT.
A03	1	3006237-009	Power PCB	See Ref. for F1, F2, F4 - View Component A03	21330-000130
A07	1	3006394-02	Contact PCB	View Component A07	21330-000131
A17	1	3008897-002	Interconnect Bracket	View Component A17	21300-001337
W01	1	3009677-05	Power PCB/Therapy PCB Cable	View Component W01	21330-000159
W02	1	3009726-05	A03 Power PCB/A04 Therapy PCB Cable	View Component W02	21300-001373
W05	1	3009678-005	A03 Power PCB/A07 Contact PCB Cable	View Component W05	21330-000160
W07	1	3007991-005	ECG Connector Cable	View Component W07	21300-002926
W08	1	3009652-01	System Connector Cable	View Component W08	21330-000156
W09	1	3008392-00	Auxiliary Connector Cable	View Component W09	21330-000144
W10	1	3009726-08	Battery Pins/A03 Power PCB Cable	View Component W10	21300-001374
W14	1	3009276-02	A01 System PCB/PC Card Slot Cable	View Component W14	21300-000154

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Rear Case Common Parts *(continued)*

Item	Qty	MIN	Part Description	Note	CAT.
4	1	3006114-006	Rear Case		11220-000008
16	1	3006291-00	Drain Seal		21300-001284
18	2	3006824-01	Gurney Hook		21300-001300
24	1	3006375-02	Battery Retainer		21300-001287
26	1	3006240-001	Blank Door		21300-001281
26	1	3011422-00	Modem Door Kit	If modem is installed	11150-000009
28	2	3006766-02	Paddle Cover Latch Assembly		21300-001294
32	1	3010593-00	High Voltage Shield		21300-001407
34	1	3006239-04	Parameter Bezel (Nellcor)		21300-001280
34	1	3006239-005	Parameter Bezel (Masimo)		21300-005675
44	2	3006374-00	Battery Latch		21300-001286
46	1	3006379-003	Relay Bracket	RPL, using Ref Kit 3011608-024	40998-000118
48	1	3006808-00	Modem Bracket		21300-001289
60	1	3012535-01	Capacitor Bracket		21300-001571
62	1	3010520-02	A03 Power PCB Bracket		21300-001399
148	1	3009787-01	Energy Storage Capacitor Shield		21300-001377

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Rear Case Common Parts *(continued)*

Item	Qty	MIN	Part Description	Note	CAT.
150	1	3010591-010	Rear Case EMI Shield (EMI Version)		21300-001405
152	1	805542-00	Energy Storage Capacitor End Shield		21300-002660
154	1	800943-09	International High Voltage Label		21501-000248
156	1	804194-00	Energy Storage Capacitor Mount Cover		21300-002368
160	1	3009057-008	Serial Number Label		21501-001281
166	1	3009060-001	FDA Label		21501-000088
168	1	3009061-00	W09 Auxiliary Connector Cable Label		21501-000089
174	1	3009789-002	Left Latch Cover Label		21501-000124
176	1	3009789-003	Right Latch Cover Label		21501-000125
186	4	802278-02	Battery Pin		21300-002023
192	1	804447-20	Adhesive Part, 3.0 W × 2.0 H × 0.1 T	Used on Item A15	21300-002459
202	4	802885-00	Mounting Foot		21300-002137
208	4	804206-01	Battery Grommet		21300-002383
214	2	806091-00	Stainless Steel Connector Nut		21300-002691
216	4	201508-000	Carbon Steel Lock Nut, 4-40 Thread		21300-000804
220	2	805487-00	Rear Connector Seal Plate		21300-002650

(Continued on next page)

Rear Case Common Parts *(continued)*

Item	Qty	MIN	Part Description	Note	CAT.
222	7	200536-001	Self-locking Cable Tie .10 W × 4.0 L		21300-000499
224	1	200536-011	Self-locking Cable Tie .35 W × 21.0 L		21300-000504
230	30	202253-761	Nylock Screw, 4-40 × .312 L		21300-001038
232	35	201407-069	Nylock Screw, 6-32 × .375 L		21300-000777
234	4	202253-729	Nylock Screw, 2-56 × .312 L		21300-001036
236	1	805915-01	W07 ECG Connector Cable Gasket		21300-002683
240	2	200060-011	System and Aux Connector O-ring Seals		21300-000203
248	1	3010569-02	Nylon Hex Standoff		21300-001402
266	1	3203396-000	Sponge, with Adhesive		21300-006142
336	5	200804-102	Flat Washer .312 OD × .125 ID		21300-000580
340	1	3012209-00	CO2 Exhaust Seal		21300-001563
398	1	804447-35	Foam Spacer, Modemflex		21300-005557
Ref	3	3010749-006	Fuse, 15A, 32V (F1, F2, F4)	Replaceable; **A03 Power PCB**	21300-001410

Biphasic Parts—Biphasic Devices

These parts are common to all biphasic devices, regardless of options or language.

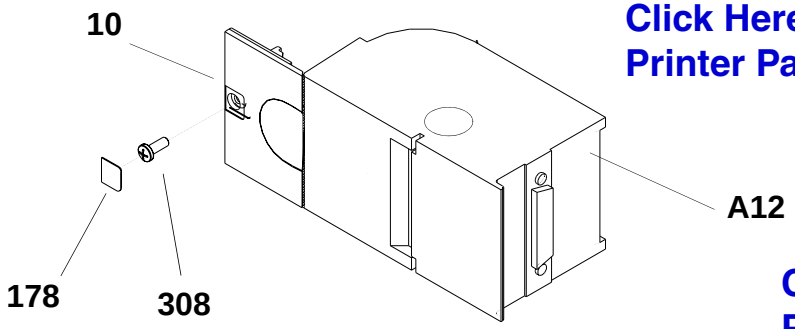
Item	Qty	MIN	Part Description	Note	CAT.
A13	1	3201583-000	Transfer Relay Assembly	View Component A13	21330-000920
A14	1	3010212-02	Inductive Resistor	View Component A14	21300-001392
A15	1	3008164-002	Energy Storage Capacitor	View Component A15	21300-001320
A22	1	3010178-012	Biphasic Module PCB	View Component A22	21330-000176
W20	1	3011792-003	Biphasic to Therapy PCB Flex Cable	View Component W20	21300-001528
324	1	3011589-03	Biphasic PCB Mounting Bracket		21300-001445
328	1	3011979-00	Wire Harness J3 to Pin 9		21300-001541
330	1	3011979-01	Wire Harness J1 to Pin 3		21300-001542
332	1	3011979-02	Wire Harness J8 to Pin 6		21300-001543
336	2	200804-102	Flat Washer .312 OD x .125 ID		21300-000580
374	1	3012345-00	Ground Strap		21300-001567

Monophasic Parts—Monophasic Devices

These parts are common to all monophasic devices, regardless of options or language.

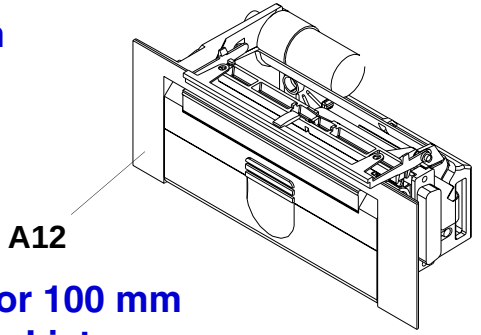
Item	Qty	MIN	Part Description	Note	CAT.
A13	1	3006219-01	Transfer Relay Assembly	View Component A13	21300-001274
A14	1	3006221-01	Waveshaping Inductor	View Component A14	21300-001276
A15	1	3006220-01	Energy Storage Capacitor	View Component A15	21300-001275
52	1	3007005-02	A14 Waveshaping Inductor Bracket		Not available at this time
303	1	804447-33	Adhesive Part, 1.0 W × 3.0 H × .125 T	Used on Item A14	21300-002463

A12 Printers



50 mm Printer

Click Here for 50 mm Printer Parts List

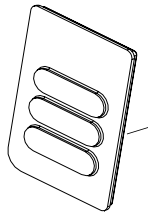


100 mm Printer

Click Here for 100 mm Printer Parts List

Item	Qty	MIN	Part Description	Note	CAT.
A12	1	3011714-00	50 mm Printer (w/ Front Case MIN 3006113-02)	**Mfg Date** < 1 May 98	Not available at this time
A12	1	804189-02	50 mm Printer (w/ Front Case MIN 3006113-03)	**Mfg Date** > 1 May 98	21300-002360
A12	1	3006229-003	100 mm Printer		21300-001277
10	1	3006115-01	50 mm Printer Cover		21300-001265
178	1	3009790-00	50 mm Printer Screw Cover		21501-000126
232	3	201407-069	Nylock Screw, 6-32 × .375 L		21300-000777

A09 Small Keypad Language



A09

Without 12-Lead

Item	Qty	MIN	Part Description	Note	CAT.
A09	1	3006189-01	Small Keypad – English	Without 12-Lead key	21330-000045
A09	1	3006189-03	Small Keypad – German	Without 12-Lead key	21330-000047
A09	1	3006189-05	Small Keypad – French	Without 12-Lead key	21330-000049
A09	1	3006189-07	Small Keypad – Spanish	Without 12-Lead key	21330-000051
A09	1	3006189-09	Small Keypad – Italian	Without 12-Lead key	21330-000053
A09	1	3006189-11	Small Keypad – Swedish	Without 12-Lead key	21330-000055
A09	1	3006189-13	Small Keypad – Danish	Without 12-Lead key	21330-000056
A09	1	3006189-15	Small Keypad – Portuguese	Without 12-Lead key	21330-000977
A09	1	3006189-17	Small Keypad – Norwegian	Without 12-Lead key	21330-000059
A09	1	3006189-19	Small Keypad – Dutch	Without 12-Lead key	21330-000061
A09	1	3006189-21	Small Keypad – Polish	Without 12-Lead key	21330-000063
A09	1	3006189-23	Small Keypad – Finnish	Without 12-Lead key	21330-000065
A09	1	3006189-024	Small Keypad – Japanese	Without 12-Lead key	21330-000925

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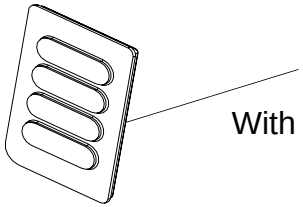
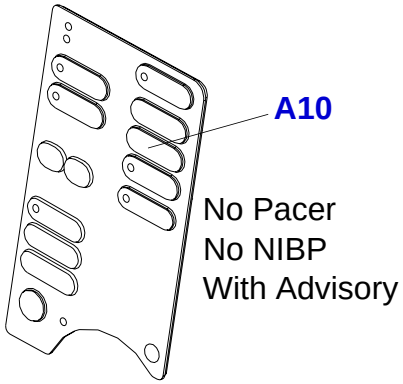
A09 Small Keypad Language *(continued)*



Item	Qty	MIN	Part Description	Note	CAT.
A09	1	3006189-00	Small Keypad – English	With 12-Lead key	21330-000044
A09	1	3006189-02	Small Keypad – German	With 12-Lead key	21330-000046
A09	1	3006189-04	Small Keypad – French	With 12-Lead key	21330-000048
A09	1	3006189-06	Small Keypad – Spanish	With 12-Lead key	21330-000050
A09	1	3006189-08	Small Keypad – Italian	With 12-Lead key	21330-000052
A09	1	3006189-10	Small Keypad – Swedish	With 12-Lead key	21330-000054
A09	1	3006189-12	Small Keypad – Danish	With 12-Lead key	21330-000976
A09	1	3006189-14	Small Keypad – Portuguese	With 12-Lead key	21330-000057
A09	1	3006189-16	Small Keypad – Norwegian	With 12-Lead key	21330-000058
A09	1	3006189-18	Small Keypad – Dutch	With 12-Lead key	21330-000060
A09	1	3006189-20	Small Keypad – Polish	With 12-Lead key	21330-000062
A09	1	3006189-025	Small Keypad – Japanese	Without 12-Lead key	21330-000926

A10 Large Keypad Language



Item	Qty	MIN	Part Description	CAT.
A10	1	3006190-202	A10 Large Keypad – English	21330-000122
A10	1	3006190-205	A10 Large Keypad – German	21330-000067
A10	1	3006190-208	A10 Large Keypad – French	21330-000937
A10	1	3006190-211	A10 Large Keypad – Spanish	21330-000938
A10	1	3006190-214	A10 Large Keypad – Italian	21330-000074
A10	1	3006190-217	A10 Large Keypad – Swedish	21330-000077
A10	1	3006190-220	A10 Large Keypad – Danish	21330-000079
A10	1	3006190-223	A10 Large Keypad – Portuguese	21330-000994
A10	1	3006190-226	A10 Large Keypad – Norwegian	21330-000946
A10	1	3006190-229	A10 Large Keypad – Dutch	21330-000084
A10	1	3006190-232	A10 Large Keypad – Polish	21330-000086
A10	1	3006190-235	A10 Large Keypad – Finnish	21330-000089
A10	1	3006190-297	A10 Large Keypad – Japanese	21330-000929

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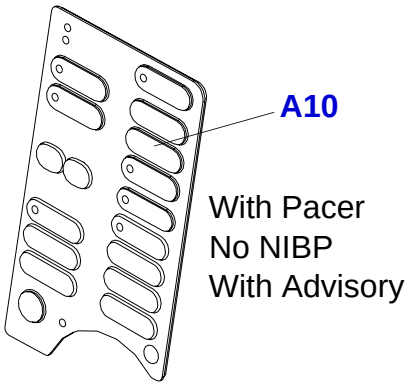
A10 Large Keypad Language *(continued)*



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No NIBP
With Advisory

Item	Qty	MIN	Part Description	CAT.
A10	1	3006190-201	A10 Large Keypad – English	21330-000121
A10	1	3006190-204	A10 Large Keypad – German	21330-000066
A10	1	3006190-207	A10 Large Keypad – French	21330-000069
A10	1	3006190-210	A10 Large Keypad – Spanish	21330-000071
A10	1	3006190-213	A10 Large Keypad – Italian	21330-000073
A10	1	3006190-216	A10 Large Keypad – Swedish	21330-000076
A10	1	3006190-219	A10 Large Keypad – Danish	21330-000078
A10	1	3006190-222	A10 Large Keypad – Portuguese	21330-000943
A10	1	3006190-225	A10 Large Keypad – Norwegian	21330-000081
A10	1	3006190-228	A10 Large Keypad – Dutch	21330-000083
A10	1	3006190-231	A10 Large Keypad – Polish	21330-000085
A10	1	3006190-234	A10 Large Keypad – Finnish	21330-000088
A10	1	3006190-299	A10 Large Keypad – Japanese	21330-000931

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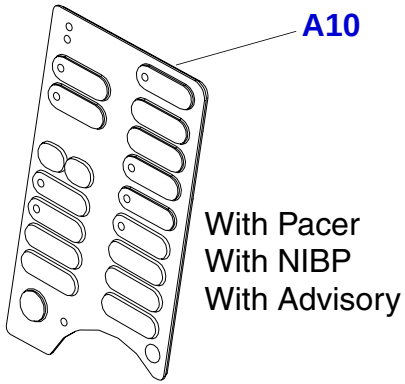
A10 Large Keypad Language *(continued)*



Item	Qty	MIN	Part Description	CAT.
A10	1	3006190-200	A10 Large Keypad – English	21330-000120
A10	1	3006190-203	A10 Large Keypad – German	21330-000123
A10	1	3006190-206	A10 Large Keypad – French	21330-000068
A10	1	3006190-209	A10 Large Keypad – Spanish	21330-000070
A10	1	3006190-212	A10 Large Keypad – Italian	21330-000072
A10	1	3006190-215	A10 Large Keypad – Swedish	21330-000075
A10	1	3006190-218	A10 Large Keypad – Danish	21330-000939
A10	1	3006190-221	A10 Large Keypad – Portuguese	21330-000080
A10	1	3006190-224	A10 Large Keypad – Norwegian	21330-000945
A10	1	3006190-227	A10 Large Keypad – Dutch	21330-000082
A10	1	3006190-230	A10 Large Keypad – Polish	21330-000947
A10	1	3006190-233	A10 Large Keypad – Finnish	21330-000087
A10	1	3006190-303	A10 Large Keypad – Japanese	21330-000935

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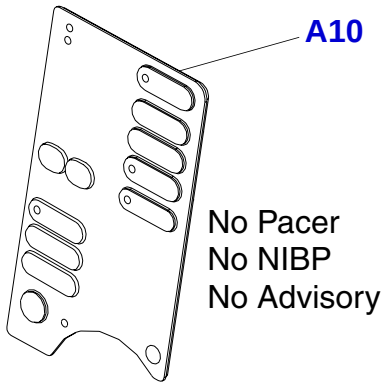
A10 Large Keypad Language *(continued)*



Item	Qty	MIN	Part Description	CAT.
A10	1	3006190-238	A10 Large Keypad – English	21330-000092
A10	1	3006190-241	A10 Large Keypad – German	21330-000095
A10	1	3006190-244	A10 Large Keypad – French	21330-000949
A10	1	3006190-247	A10 Large Keypad – Spanish	21330-000951
A10	1	3006190-250	A10 Large Keypad – Italian	21330-000952
A10	1	3006190-253	A10 Large Keypad – Swedish	21330-000101
A10	1	3006190-256	A10 Large Keypad – Danish	21330-000956
A10	1	3006190-259	A10 Large Keypad – Portuguese	21330-000959
A10	1	3006190-262	A10 Large Keypad – Norwegian	21330-000961
A10	1	3006190-265	A10 Large Keypad – Dutch	21330-000963
A10	1	3006190-268	A10 Large Keypad – Polish	21330-000966
A10	1	3006190-271	A10 Large Keypad – Finnish	21330-000106
A10	1	3006190-296	A10 Large Keypad – Japanese	21330-000928

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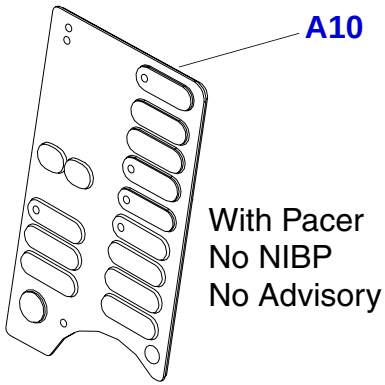
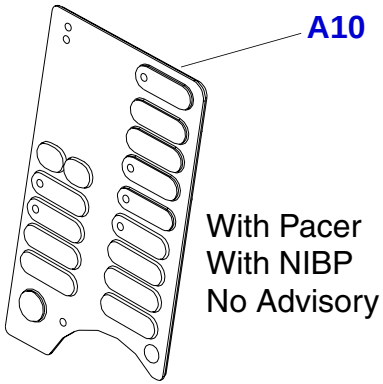
A10 Large Keypad Language *(continued)*



Item	Qty	MIN	Part Description	CAT.
A10	1	3006190-237	A10 Large Keypad – English	21330-000091
A10	1	3006190-240	A10 Large Keypad – German	21330-000094
A10	1	3006190-243	A10 Large Keypad – French	21330-000948
A10	1	3006190-246	A10 Large Keypad – Spanish	21330-000097
A10	1	3006190-249	A10 Large Keypad – Italian	21330-000099
A10	1	3006190-252	A10 Large Keypad – Swedish	21330-000936
A10	1	3006190-255	A10 Large Keypad – Danish	21330-000955
A10	1	3006190-258	A10 Large Keypad – Portuguese	21330-000958
A10	1	3006190-261	A10 Large Keypad – Norwegian	21330-000960
A10	1	3006190-264	A10 Large Keypad – Dutch	21330-000962
A10	1	3006190-267	A10 Large Keypad – Polish	21330-000965
A10	1	3006190-270	A10 Large Keypad – Finnish	21330-000105
A10	1	3006190-298	A10 Large Keypad – Japanese	21330-000930

(Continued on next page)

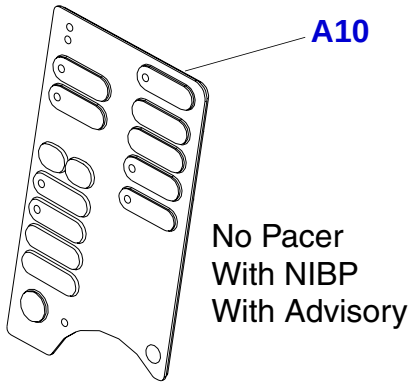
A10 Large Keypad Language *(continued)*



Item	Qty	MIN	Part Description	CAT.
A10	1	3006190-236	A10 Large Keypad – English	21330-000090
A10	1	3006190-239	A10 Large Keypad – German	21330-000093
A10	1	3006190-242	A10 Large Keypad – French	21330-000096
A10	1	3006190-245	A10 Large Keypad – Spanish	21330-000950
A10	1	3006190-248	A10 Large Keypad – Italian	21330-000098
A10	1	3006190-251	A10 Large Keypad – Swedish	21330-000100
A10	1	3006190-254	A10 Large Keypad – Danish	21330-000954
A10	1	3006190-257	A10 Large Keypad – Portuguese	21330-000957
A10	1	3006190-260	A10 Large Keypad – Norwegian	21330-000102
A10	1	3006190-263	A10 Large Keypad – Dutch	21330-000103
A10	1	3006190-266	A10 Large Keypad – Polish	21330-000964
A10	1	3006190-269	A10 Large Keypad – Finnish	21330-000104
A10	1	3006190-302	A10 Large Keypad – Japanese	21330-000934

(Continued on next page)

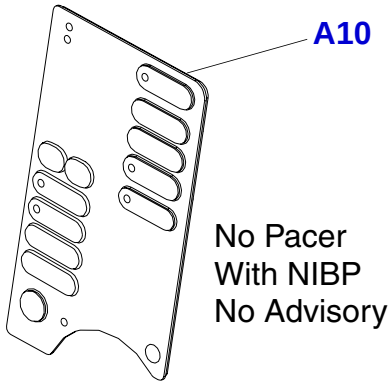
A10 Large Keypad Language *(continued)*



Item	Qty	MIN	Part Description	CAT.
A10	1	3006190-272	A10 Large Keypad – English	21330-000107
A10	1	3006190-273	A10 Large Keypad – German	21330-000108
A10	1	3006190-274	A10 Large Keypad – French	21330-000109
A10	1	3006190-275	A10 Large Keypad – Spanish	21330-000110
A10	1	3006190-276	A10 Large Keypad – Italian	21330-000111
A10	1	3006190-277	A10 Large Keypad – Swedish	21330-000112
A10	1	3006190-278	A10 Large Keypad – Danish	21330-000113
A10	1	3006190-279	A10 Large Keypad – Portuguese	21330-000967
A10	1	3006190-280	A10 Large Keypad – Norwegian	21330-000968
A10	1	3006190-281	A10 Large Keypad – Dutch	21330-000114
A10	1	3006190-282	A10 Large Keypad – Polish	21330-000969
A10	1	3006190-283	A10 Large Keypad – Finnish	21330-000115
A10	1	3006190-301	A10 Large Keypad – Japanese	21330-000933

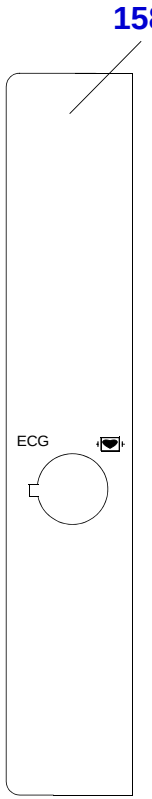
(Continued on next page)

A10 Large Keypad Language *(continued)*



Item	Qty	MIN	Part Description	CAT.
A10	1	3006190-284	A10 Large Keypad – English	21330-000725
A10	1	3006190-285	A10 Large Keypad – German	21330-000116
A10	1	3006190-286	A10 Large Keypad – French	21330-000970
A10	1	3006190-287	A10 Large Keypad – Spanish	21330-000971
A10	1	3006190-288	A10 Large Keypad – Italian	21330-000117
A10	1	3006190-289	A10 Large Keypad – Swedish	21330-000972
A10	1	3006190-290	A10 Large Keypad – Danish	21330-000726
A10	1	3006190-291	A10 Large Keypad – Portuguese	21330-000973
A10	1	3006190-292	A10 Large Keypad – Norwegian	21330-000974
A10	1	3006190-293	A10 Large Keypad – Dutch	21330-000118
A10	1	3006190-294	A10 Large Keypad – Polish	21330-000975
A10	1	3006190-295	A10 Large Keypad – Finnish	21330-000119
A10	1	3006190-300	A10 Large Keypad – Japanese	21330-000932

Parameter Bezel Label Language



Item	Qty	MIN	Part Description	Note	CAT.
158	1	3006241-00	Parameter Bezel Label – English, French, Spanish, Italian, Portuguese, Dutch, Polish, and Japanese		21501-000025
158	1	3006241-05	Parameter Bezel Label – German, Swedish, Danish, Norwegian, and Finnish		21501-000027

No Options

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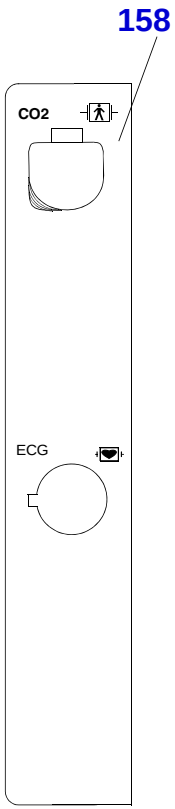
Parameter Bezel Label Language *(continued)*



With CO2

Item	Qty	MIN	Part Description	Note	CAT.
158	1	3006241-55	Parameter Bezel Label – English, French, Spanish, Italian, Portuguese, Dutch, Polish, and Japanese		21501-000055
158	1	3006241-56	Parameter Bezel Label – German, Swedish, Danish, Norwegian, and Finnish		21501-000056

(Continued on next page)

Parameter Bezel Label Language *(continued)*

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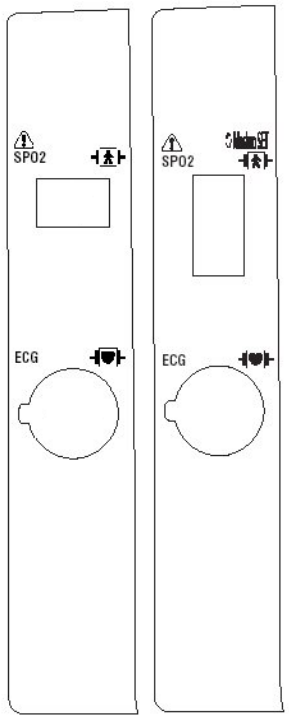

Nellcor Masimo

With SpO2

Item	Qty	MIN	Part Description	Note	CAT.
158	1	3006241-01	Parameter Bezel Label – English, French, Spanish, Italian, Portuguese, Dutch, Polish, and Japanese	Nellcor SpO2	21501-000026
158	1	3006241-06	Parameter Bezel Label – German, Swedish, Danish, Norwegian, and Finnish	Nellcor SpO2	21501-000028
158	1	3006241-084	Parameter Bezel Label – English, French, Spanish, Italian, Portuguese, Dutch, and Polish	Masimo SpO2	21501-001161
158	1	3006241-085	Parameter Bezel Label – German, Swedish, Danish, Norwegian, and Finnish	Masimo SpO2	21501-001162

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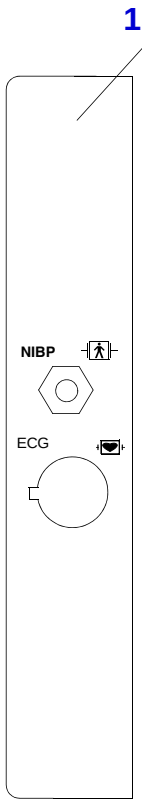
(Continued on next page)

Parameter Bezel Label Language *(continued)*



With NIBP

Item	Qty	MIN	Part Description	Note	CAT.
158	1	3006241-35	Parameter Bezel Label – English, Dutch, Polish, and Japanese	Nellcor Bezel	21501-000043
158	1	3006241-37	Parameter Bezel Label – German, Swedish, Danish, Norwegian, and Finnish	Nellcor Bezel	21501-000044
158	1	3006241-38	Parameter Bezel Label – French, Spanish, and Portuguese,	Nellcor Bezel	21501-000046
158	1	3006241-39	Parameter Bezel Label – Italian	Nellcor Bezel	21501-000046
158	1	3006241-090	Parameter Bezel Label – English, Dutch, Polish, and Japanese	NIBP moved for Masimo SpO2 parameter bezel	21501-001167
158	1	3006241-091	Parameter Bezel Label – German, Swedish, Danish, Norwegian, and Finnish	NIBP moved for Masimo SpO2 parameter bezel	21501-001168
158	1	3006241-092	Parameter Bezel Label – French, Spanish, and Portuguese,	NIBP moved for Masimo SpO2 parameter bezel	21501-01169
158	1	3006241-093	Parameter Bezel Label – Italian	NIBP moved for Masimo SpO2 parameter bezel	21501-001170

(Continued on next page)

Parameter Bezel Label Language *(continued)*

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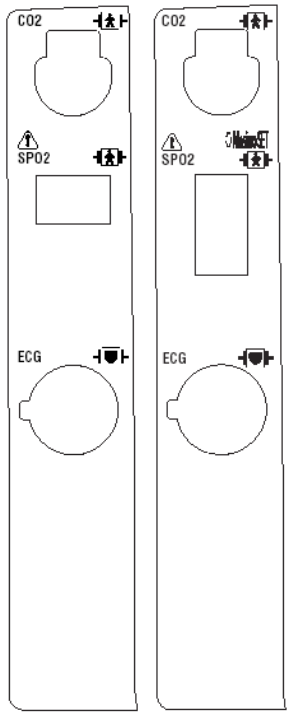

Nellcor Masimo

With CO2 and SpO2

Item	Qty	MIN	Part Description	Note	CAT.
158	1	3006241-45	Parameter Bezel Label – English, French, Spanish, Italian, Portuguese, Dutch, Polish, and Japanese	Nellcor SpO2	21501-000049
158	1	3006241-46	Parameter Bezel Label – German, Swedish, Danish, Norwegian, and Finnish	Nellcor SpO2	21501-000050
158	1	3006241-099	Parameter Bezel Label – English, French, Spanish, Italian, Portuguese,Dutch, Polish, and Japanese	Masimo SpO2	21501-001176
158	1	3006241-100	Parameter Bezel Label – German, Swedish, Danish, Norwegian, and Finnish	Masimo SpO2	21501-001177

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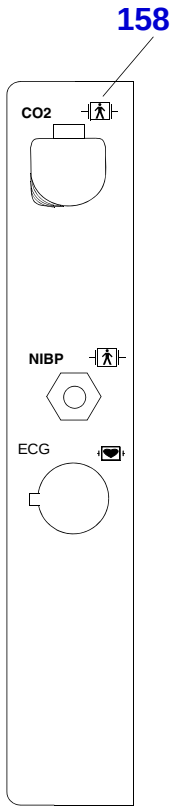
(Continued on next page)

Parameter Bezel Label Language *(continued)*



With CO2 and NIBP

Item	Qty	MIN	Part Description	Note	CAT.
158	1	3006241-51	Parameter Bezel Label – English, Dutch, Polish, and Japanese	Nellcor Bezel	21501-000053
158	1	3006241-52	Parameter Bezel Label – German, Swedish, Danish, Norwegian, and Finnish	Nellcor Bezel	21501-001215
158	1	3006241-53	Parameter Bezel Label – French, Spanish, and Portuguese	Nellcor Bezel	21501-000054
158	1	3006241-54	Parameter Bezel Label – Italian	Nellcor Bezel	21501-001216
158	1	3006241-105	Parameter Bezel Label – English, Dutch, Polish, and Japanese	NIBP moved for Masimo SpO2	21501-001187
158	1	3006241-106	Parameter Bezel Label – German, Swedish, Danish, Norwegian, and Finnish	NIBP moved for Masimo SpO2	21501-001188
158	1	3006241-107	Parameter Bezel Label – French, Spanish, and Portuguese	NIBP moved for Masimo SpO2	21501-001189
158	1	3006241-108	Parameter Bezel Label – Italian	NIBP moved for Masimo SpO2	21501-001190

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(Continued on next page)

Parameter Bezel Label Language *(continued)*

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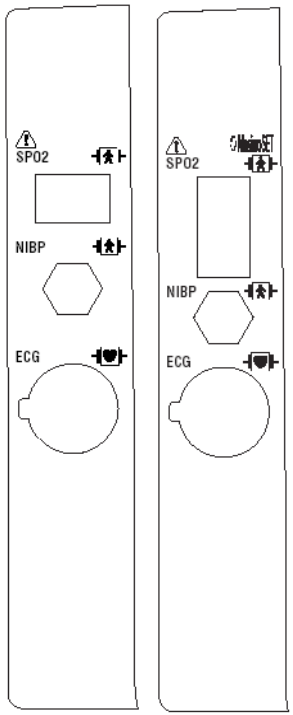

Nellcor Masimo

With SpO2 and NIBP

Item	Qty	MIN	Part Description	Note	CAT.
158	1	3006241-17	Parameter Bezel Label – English, Dutch, Polish, and Japanese	Nellcor SpO2	21501-000030
158	1	3006241-20	Parameter Bezel Label – German, Swedish, Danish, Norwegian, and Finnish	Nellcor SpO2	21501-000032
158	1	3006241-21	Parameter Bezel Label – French, Spanish, and Portuguese	Nellcor SpO2	21501-000033
158	1	3006241-22	Parameter Bezel Label – Italian	Nellcor SpO2	21501-000034
158	1	3006241-086	Parameter Bezel Label – English, Dutch, Polish, and Japanese	Masimo SpO2	21501-001163
158	1	3006241-087	Parameter Bezel Label – German, Swedish, Danish, Norwegian, and Finnish	Masimo SpO2	21501-001164
158	1	3006241-088	Parameter Bezel Label – French, Spanish, and Portuguese	Masimo SpO2	21501-001165
158	1	3006241-089	Parameter Bezel Label – Italian	Masimo SpO2	21501-001166

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(Continued on next page)

Parameter Bezel Label Language *(continued)*

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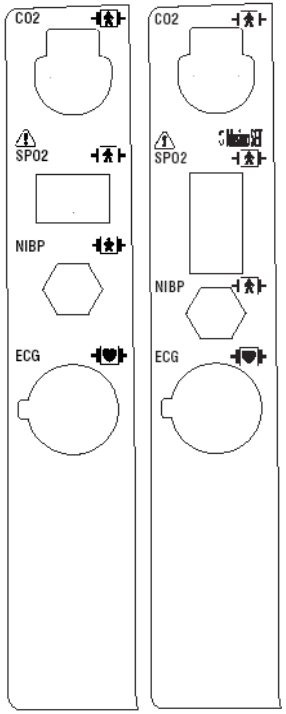

Nellcor Masimo

With CO2 and SpO2 and NIBP

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Item	Qty	MIN	Part Description	Note	CAT.
158	1	3006241-47	Parameter Bezel Label – English, Dutch, Polish, and Japanese	Nellcor SpO2	21501-000051
158	1	3006241-48	Parameter Bezel Label – German, Swedish, Danish, Norwegian, and Finnish	Nellcor SpO2	21501-000052
158	1	3006241-49	Parameter Bezel Label – French, Spanish, and Portuguese	Nellcor SpO2	21501-000037
158	1	3006241-50	Parameter Bezel Label – Italian	Nellcor SpO2	21501-001214
158	1	3006241-101	Parameter Bezel Label – English, Dutch, Polish, and Japanese	Masimo SpO2	21501-001178
158	1	3006241-102	Parameter Bezel Label – German, Swedish, Danish, Norwegian, and Finnish	Masimo SpO2	21501-001184
158	1	3006241-103	Parameter Bezel Label – French, Spanish, and Portuguese	Masimo SpO2	21501-001185
158	1	3006241-104	Parameter Bezel Label – Italian	Masimo SpO2	21501-001186

(Continued on next page)

Parameter Bezel Label Language *(continued)*

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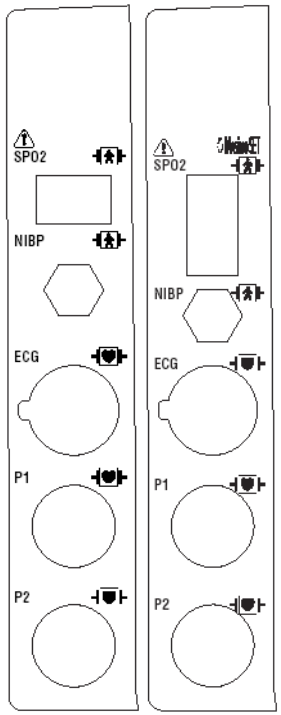

Nellcor Masimo

With SpO2, NIBP, and IP

Item	Qty	MIN	Part Description	Note	CAT.
158	1	3006241-57	Parameter Bezel Label – English, Dutch, Polish, and Japanese	Nellcor SpO2	21501-000556
158	1	3006241-59	Parameter Bezel Label – German, Swedish, Danish, Norwegian, and Finnish	Nellcor SpO2	21501-000724
158	1	3006241-58	Parameter Bezel Label – French	Nellcor SpO2	21501-000793
158	1	3006241-60	Parameter Bezel Label – Spanish, and Portuguese	Nellcor SpO2	21501-001217
158	1	3006241-61	Parameter Bezel Label – Italian	Nellcor SpO2	21501-001218
158	1	3006241-109	Parameter Bezel Label – English, Dutch, and Polish	Masimo SpO2	21501-001191
158	1	3006241-111	Parameter Bezel Label – German, Swedish, Danish, Norwegian, and Finnish	Masimo SpO2	21501-001193
158	1	3006241-110	Parameter Bezel Label – French	Masimo SpO2	21501-001192
158	1	3006241-112	Parameter Bezel Label – Spanish, and Portuguese	Masimo SpO2	21501-001194
158	1	3006241-113	Parameter Bezel Label – Italian	Masimo SpO2	21501-001195

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(Continued on next page)

Parameter Bezel Label Language *(continued)*

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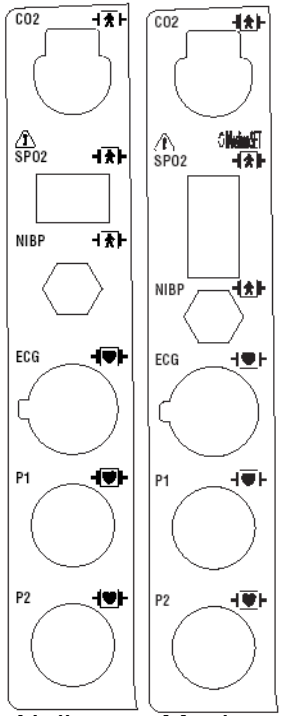

Nellcor Masimo

With CO2, SpO2, NIBP, and IP

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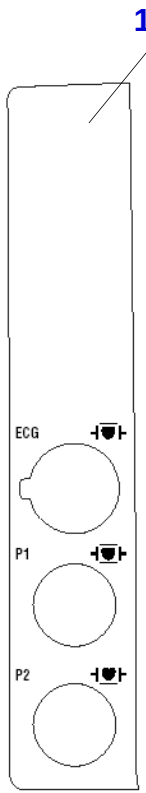
Item	Qty	MIN	Part Description	Note	CAT.
158	1	3006241-40	Parameter Bezel Label – English, Dutch, Polish, and Japanese	Nellcor SpO2	21501-000047
158	1	3006241-42	Parameter Bezel Label – German, Swedish, Danish, Norwegian, and Finnish	Nellcor SpO2	21501-000722
158	1	3006241-41	Parameter Bezel Label – French	Nellcor SpO2	21501-000048
158	1	3006241-43	Parameter Bezel Label – Spanish, and Portuguese	Nellcor SpO2	21501-001212
158	1	3006241-44	Parameter Bezel Label – Italian	Nellcor SpO2	21501-001213
158	1	3006241-094	Parameter Bezel Label – English, Dutch, Polish, and Japanese	Masimo SpO2	21501-001171
158	1	3006241-096	Parameter Bezel Label – German, Swedish, Danish, Norwegian, and Finnish	Masimo SpO2	21501-001173
158	1	3006241-095	Parameter Bezel Label – French	Masimo SpO2	21501-001172
158	1	3006241-097	Parameter Bezel Label – Spanish, and Portuguese	Masimo SpO2	21501-001174
158	1	3006241-098	Parameter Bezel Label – Italian	Nellcor SpO2	21501-001175

(Continued on next page)

Parameter Bezel Label Language *(continued)*



With IP

Item	Qty	MIN	Part Description	Note	CAT.
158	1	3006241-62	Parameter Bezel Label – English, Spanish, Italian, Portuguese, Dutch, Polish, and Japanese		21501-001219
158	1	3006241-64	Parameter Bezel Label – German, Swedish, Danish, Norwegian, and Finnish		21501-001221
158	1	3006241-63	Parameter Bezel Label – French		21501-001220

(Continued on next page)

Parameter Bezel Label Language *(continued)*

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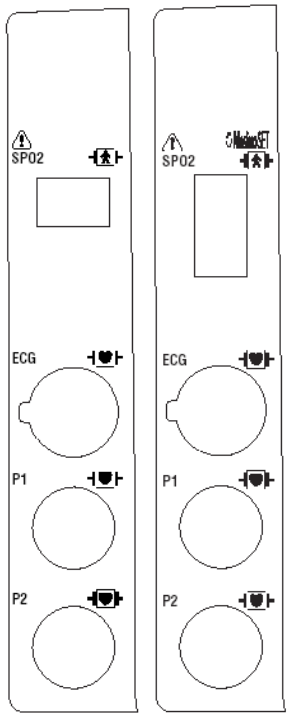

Nellcor Masimo

With SpO2 and IP

Item	Qty	MIN	Part Description	Note	CAT.
158	1	3006241-65	Parameter Bezel Label – English, Spanish, Italian, Portuguese, Dutch, Polish, and Japanese	Nellcor SpO2	21501-001222
158	1	3006241-67	Parameter Bezel Label – German, Swedish, Danish, Norwegian, and Finnish	Nellcor SpO2	21501-001224
158	1	3006241-66	Parameter Bezel Label – French	Nellcor SpO2	21501-001223
158	1	3006241-114	Parameter Bezel Label – English, Spanish, Italian, Portuguese, Dutch, Polish, and Japanese	Masimo SpO2	21501-001196
158	1	3006241-116	Parameter Bezel Label – German, Swedish, Danish, Norwegian, and Finnish	Masimo SpO2	21501-001198
158	1	3006241-115	Parameter Bezel Label – French	Masimo SpO2	21501-001197

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(Continued on next page)

Parameter Bezel Label Language *(continued)*

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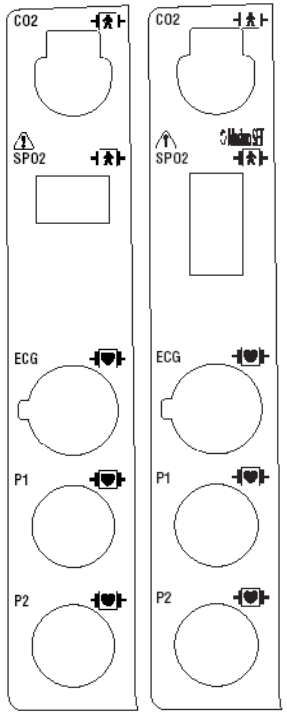

Nellcor Masimo

With SpO2, CO2 and IP

Item	Qty	MIN	Part Description	Note	CAT.
158	1	3006241-68	Parameter Bezel Label – English, Spanish, Italian, Portuguese, Dutch, Polish, and Japanese	Nellcor SpO2	21501-001225
158	1	3006241-70	Parameter Bezel Label – German, Swedish, Danish, Norwegian, and Finnish	Nellcor SpO2	21501-001227
158	1	3006241-69	Parameter Bezel Label – French	Nellcor SpO2	21501-001226
158	1	3006241-117	Parameter Bezel Label – English, Spanish, Italian, Portuguese, Dutch, Polish, and Japanese	Masimo SpO2	21501-001199
158	1	3006241-119	Parameter Bezel Label – German, Swedish, Danish, Norwegian, and Finnish	Masimo SpO2	21501-001201
158	1	3006241-118	Parameter Bezel Label – French	Masimo SpO2	21501-001200

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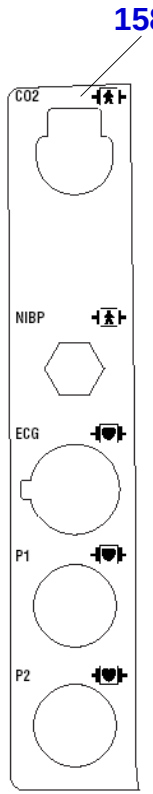
(Continued on next page)

Parameter Bezel Label Language *(continued)*



With NIBP, CO2, and IP

Item	Qty	MIN	Part Description	Note	CAT.
158	1	3006241-71	Parameter Bezel Label – English, Dutch, Polish, and Japanese	Nellcor Bezel	21501-001228
158	1	3006241-73	Parameter Bezel Label – German, Swedish, Danish, Norwegian, and Finnish	Nellcor Bezel	21501-001230
158	1	3006241-72	Parameter Bezel Label – French	Nellcor Bezel	21501-001229
158	1	3006241-74	Parameter Bezel Label – Spanish and Portuguese	Nellcor Bezel	21501-001231
158	1	3006241-75	Parameter Bezel Label – Italian	Nellcor Bezel	21501-001232
158	1	3006241-120	Parameter Bezel Label – English, Dutch, Polish, and Japanese	NIBP moved for Masimo SpO2	21501-001202
158	1	3006241-122	Parameter Bezel Label – German, Swedish, Danish, Norwegian, and Finnish	NIBP moved for Masimo SpO2	21501-001204
158	1	3006241-121	Parameter Bezel Label – French	NIBP moved for Masimo SpO2	21501-001203
158	1	3006241-123	Parameter Bezel Label – Spanish and Portuguese	NIBP moved for Masimo SpO2	21501-001205
158	1	3006241-124	Parameter Bezel Label – Italian	NIBP moved for Masimo SpO2	21501-001206

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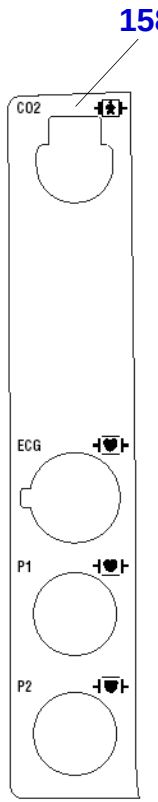
(Continued on next page)

Parameter Bezel Label Language *(continued)*



With CO2 and IP

Item	Qty	MIN	Part Description	Note	CAT.
158	1	3006241-76	Parameter Bezel Label – English, Spanish, Italian, Portuguese, Dutch, Polish, and Japanese		21501-001233
158	1	3006241-78	Parameter Bezel Label – German, Swedish, Danish, Norwegian, and Finnish		21501-001235
158	1	3006241-77	Parameter Bezel Label – French		21501-001234

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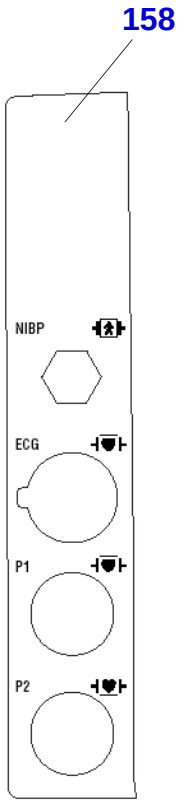
(Continued on next page)

Parameter Bezel Label Language *(continued)*



With NIBP, and IP

Item	Qty	MIN	Part Description	Note	CAT.
158	1	3006241-79	Parameter Bezel Label – English, Dutch, Polish, and Japanese	Nellcor Bezel	21501-001236
158	1	3006241-81	Parameter Bezel Label – German, Swedish, Danish, Norwegian, and Finnish	Nellcor Bezel	21501-001238
158	1	3006241-80	Parameter Bezel Label – French	Nellcor Bezel	21501-001237
158	1	3006241-82	Parameter Bezel Label – Spanish and Portuguese	Nellcor Bezel	21501-001239
158	1	3006241-83	Parameter Bezel Label – Italian	Nellcor Bezel	21501-001240
158	1	3006241-125	Parameter Bezel Label – English, Dutch, Polish, and Japanese	NIBP moved for Masimo SpO2	21501-001209
158	1	3006241-127	Parameter Bezel Label – German, Swedish, Danish, Norwegian, and Finnish	NIBP moved for Masimo SpO2	21501-001208
158	1	3006241-126	Parameter Bezel Label – French	NIBP moved for Masimo SpO2	21501-001207
158	1	3006241-128	Parameter Bezel Label – Spanish and Portuguese	NIBP moved for Masimo SpO2	21501-001210
158	1	3006241-129	Parameter Bezel Label – Italian	NIBP moved for Masimo SpO2	21501-001211

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Product Identification Label Language—Monophasic Devices

Item	Qty	MIN	Part Description	CAT.
162	1	3009058-042	Product Identification Label – English, German, Swedish, Dutch, and Norwegian	21501-000065
162	1	3009058-043	Product Identification Label – French	21501-000064
162	1	3009058-044	Product Identification Label – Spanish and Portuguese	21501-000066
162	1	3009058-045	Product Identification Label – Italian	21501-001243
162	1	3009058-046	Product Identification Label – Danish	21501-000070
162	1	3009058-047	Product Identification Label – Finnish	21501-000073
162	1	3009058-048	Product Identification Label – Polish	21501-000074
162	1	3009058-049	Product Identification Label – Japanese	21501-000718

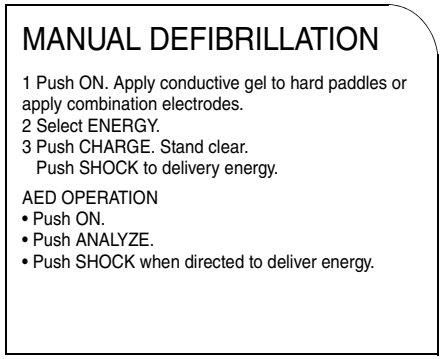
Product Identification Label Language—Biphasic Devices

162	1	3009058-050	Product Identification Label – English	21501-000068
162	1	3009058-051	Product Identification Label – German	21501-001241
162	1	3009058-052	Product Identification Label – French	21501-000725
162	1	3009058-053	Product Identification Label – Spanish and Portuguese	21501-001026
162	1	3009058-054	Product Identification Label – Italian	21501-001063
162	1	3009058-055	Product Identification Label – Swedish, Danish, and Norwegian	21501-000998
162	1	3009058-056	Product Identification Label – Dutch	21501-000077
162	1	3009058-057	Product Identification Label – Finnish	21501-000716
162	1	3009058-058	Product Identification Label – Polish	21501-001242
162	1	3009058-059	Product Identification Label – Japanese	21501-000719

Explosion/Hazard Label Language

Item	Qty	MIN	Part Description	CAT.
164	1	3009059-00	Explosion/Hazard Label – English	21501-000078
164	1	3009059-01	Explosion/Hazard Label – German	21501-000079
164	1	3009059-02	Explosion/Hazard Label – French	21501-000080
164	1	3009059-03	Explosion/Hazard Label – Spanish	21501-000081
164	1	3009059-04	Explosion/Hazard Label – Italian	21501-001064
164	1	3009059-05	Explosion/Hazard Label – Swedish	21501-000082
164	1	3009059-06	Explosion/Hazard Label – Danish	21501-000083
164	1	3009059-07	Explosion/Hazard Label – Portuguese	21501-001027
164	1	3009059-08	Explosion/Hazard Label – Norwegian	21501-000084
164	1	3009059-09	Explosion/Hazard Label – Dutch	21501-000085
164	1	3009059-10	Explosion/Hazard Label – Finnish	21501-000086
164	1	3009059-12	Explosion/Hazard Label – Polish	21501-000087
164	1	3009059-13	Explosion/Hazard Label – Japanese	21501-000717

Operating Instruction Label Language



No Pacer, with Advisory

Item	Qty	MIN	Part Description	CAT.
170	1	3009064-12	Operating Instructions Label – English	21501-000096
170	1	3009064-13	Operating Instructions Label – German	21501-000097
170	1	3009064-14	Operating Instructions Label – French	21501-000830
170	1	3009064-15	Operating Instructions Label – Spanish	21501-000098
170	1	3009064-16	Operating Instructions Label – Italian	21501-000099
170	1	3009064-17	Operating Instructions Label – Swedish	21501-000100
170	1	3009064-24	Operating Instructions Label – Danish	21501-000105
170	1	3009064-25	Operating Instructions Label – Portuguese	21501-001245
170	1	3009064-26	Operating Instructions Label – Norwegian	21501-001246
170	1	3009064-27	Operating Instructions Label – Dutch	21501-000106
170	1	3009064-28	Operating Instructions Label – Finnish	21501-000107
170	1	3009064-55	Operating Instructions Label – Polish	21501-000119
170	1	3009064-059	Operating Instructions Label – Japanese	21501-000706

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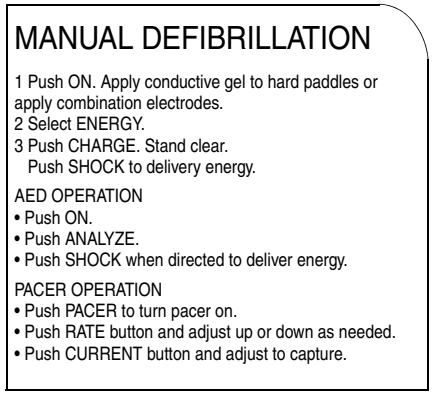
Operating Instruction Label Language *(continued)*



With Pacer and Advisory

Item	Qty	MIN	Part Description	CAT.
170	1	3009064-06	Operating Instructions Label – English	21501-000090
170	1	3009064-07	Operating Instructions Label – German	21501-000091
170	1	3009064-08	Operating Instructions Label – French	21501-000092
170	1	3009064-09	Operating Instructions Label – Spanish	21501-000093
170	1	3009064-10	Operating Instructions Label – Italian	21501-000094
170	1	3009064-11	Operating Instructions Label – Swedish	21501-000095
170	1	3009064-18	Operating Instructions Label – Danish	21501-000101
170	1	3009064-19	Operating Instructions Label – Portuguese	21501-001028
170	1	3009064-20	Operating Instructions Label – Norwegian	21501-000102
170	1	3009064-21	Operating Instructions Label – Dutch	21501-000103
170	1	3009064-22	Operating Instructions Label – Finnish	21501-000104
170	1	3009064-54	Operating Instructions Label – Polish	21501-000118
170	1	3009064-061	Operating Instructions Label – Japanese	21501-000708

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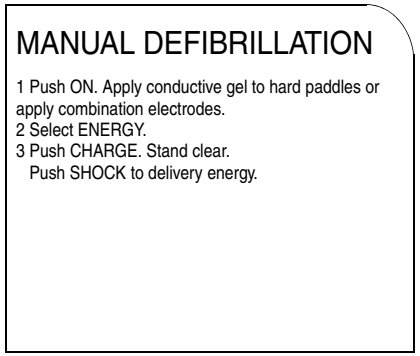
Operating Instruction Label Language *(continued)*

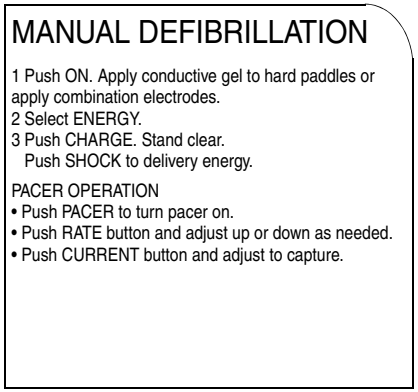


No Pacer,
no Advisory

Item	Qty	MIN	Part Description	CAT.
170	1	3009064-42	Operating Instructions Label – English	21501-000114
170	1	3009064-43	Operating Instructions Label – German	21501-001250
170	1	3009064-44	Operating Instructions Label – French	21501-001251
170	1	3009064-45	Operating Instructions Label – Spanish	21501-000115
170	1	3009064-46	Operating Instructions Label – Italian	21501-001252
170	1	3009064-47	Operating Instructions Label – Swedish	21501-001253
170	1	3009064-48	Operating Instructions Label – Danish	21501-001254
170	1	3009064-49	Operating Instructions Label – Portuguese	21501-001255
170	1	3009064-50	Operating Instructions Label – Norwegian	21501-001256
170	1	3009064-51	Operating Instructions Label – Dutch	21501-000116
170	1	3009064-52	Operating Instructions Label – Finnish	21501-000117
170	1	3009064-57	Operating Instructions Label – Polish	21501-001258
170	1	3009064-058	Operating Instructions Label – Japanese	21501-000705

(Continued on next page)

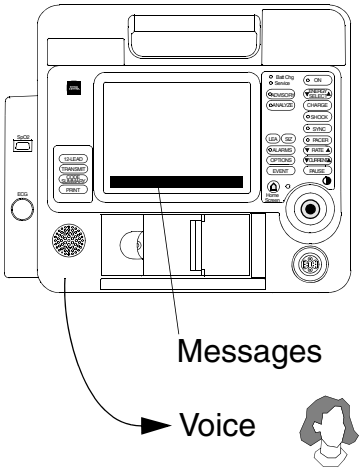
Operating Instruction Label Language *(continued)*



With Pacer, no Advisory

Item	Qty	MIN	Part Description	CAT.
170	1	3009064-30	Operating Instructions Label – English	21501-000108
170	1	3009064-31	Operating Instructions Label – German	21501-000558
170	1	3009064-32	Operating Instructions Label – French	21501-001247
170	1	3009064-33	Operating Instructions Label – Spanish	21501-000109
170	1	3009064-34	Operating Instructions Label – Italian	21501-000110
170	1	3009064-35	Operating Instructions Label – Swedish	21501-000792
170	1	3009064-36	Operating Instructions Label – Danish	21501-000111
170	1	3009064-37	Operating Instructions Label – Portuguese	21501-001248
170	1	3009064-38	Operating Instructions Label – Norwegian	21501-001249
170	1	3009064-39	Operating Instructions Label – Dutch	21501-000112
170	1	3009064-40	Operating Instructions Label – Finnish	21501-000113
170	1	3009064-56	Operating Instructions Label – Polish	21501-001257
170	1	3009064-060	Operating Instructions Label – Japanese	21501-000707

Font and Voice Software Language



Reference item -
(not a catalog item)

Qty	MIN	Dash*	Dash**	Part Description
1	3011371	-051	-074	Font/Voice System Software – English
1	3011371	-052	-075	Font/Voice System Software – French
1	3011371	-053	-076	Font/Voice System Software – German
1	3011371	-054	-077	Font/Voice System Software – Spanish
1	3011371	-055	-078	Font/Voice System Software – Italian
1	3011371	-056	-079	Font/Voice System Software – Swedish
1	3011371	-057	-080	Font/Voice System Software – Danish
1	3011371	-049	-081	Font/Voice System Software – Portuguese
1	3011371	-058	-082	Font/Voice System Software – Norwegian
1	3011371	-059	-083	Font/Voice System Software – Dutch
1	3011371	-060	-084	Font/Voice System Software – Polish
1	3011371	-050	-085	Font/Voice System Software – Finnish
1	3011371	-047	-086	Font/Voice System Software – Korean
1	3011371		-087	Font/Voice System Software – Japanese
1	3011371		-105	Font/Voice System Software – Mandarin Chinese

* For Operating Software 3011371-018 to -070
** For Operating Software 3011371-072 to -090 or later.

A12 Printer (50 mm) Parts List

Item	Qty	MIN	Description	CAT.
A12	1	804189-02	50 mm Printer [refer to **Mfg Date Note**]	21300-002360
902	2	806752-30	Printhead Bumper	21300-002778
903	1	806752-38	Gear Cover (Also included with Motor Assembly)	21300-002780
904	1	806752-73	Door Assembly (Includes Paper Ejector, Linkage Shaft, Dowel Pin, and Retaining Ring)	21300-002788
905	1	806752-50	Idler Door Gear, 108 Tooth	21300-002783
906	1	806752-48	Idler Motor Gear, 31 Tooth	21300-002782
907	1	806752-72	Motor Assembly (with Bonded 15-Tooth Motor Gear with Keyshim, Cable/ Connector, Mounting Screws, and Gear Cover)	21300-002787
908	2	806752-71	Anti-static Pad	21300-002786
909	1	806752-10	Printroller Assembly (with 32-Tooth Gear and Bearing)	21330-000656
910	1	806752-69	Retaining Ring	21300-002784
911	1	806752-44	Shaft Printroller	21300-002781
912	1	806752-28	Door Open Spring Assembly	21300-002777
913	2	806752-70	Paper Stripper	21300-002785

A12 Printer (100 mm) Parts List

Item	Qty	MIN	Description	CAT.
A12	1	3006229-02	100 mm Printer	21300-001277
1000	1	806752-112	Paper Cradle	21300-002959
1001	1	806752-114	Motor Assembly with gear	21300-003958
1002	1	806752-116	Door/Roller Assembly	21300-002776

Standard Paddle Parts — Apex and Sternum

Item	Qty	MIN	Part Description	CAT.
800	1	804246-03	Sternum Paddle Cover	21300-002405
801	1	804246-02	Apex Paddle Cover	21300-002404
802	1	802902-05	Sternum Paddle Electrode Plate	21300-002144
803	1	802902-04	Apex Paddle Electrode Plate	21300-002143
804	2	802944-02	Paddle Gasket	21300-002175
805	1	802931-03	Paddle Handle	21300-002159
806	1	802931-02	Paddle Handle	21300-002158
807	2	802932-00	I/M Key-Retainer Coil	21300-002160
808	6	201508-004	Lock Nut CS 8-32 × 5/16	21300-000807
809	1	200491-048	LED Panel Mount	21300-000472
810	2	200536-001	Retainer Cable 10 W × 4.0 L	21300-000499
811	14	201407-018	Screw 4-40 × .312 L	21300-000775
812	2	804231-00	Paddle Shield	21300-002390
813	4	804697-03	Switch	21300-002479
814	1	3009277-01	Knob	21300-001340

(Continued on next page)

Standard Paddle Parts — Apex and Sternum *(continued)*

Item	Qty	MIN	Part Description	CAT.
815	1	3009762-00	PCB Assy	21330-000953
816	1	202187-001	Retainer Knob	21300-000956
817	2	802935-09	Pushbutton Discharge	21300-002167
818	1	802935-25	Pushbutton Charge, English	21300-004199
818	1	802935-26	Pushbutton Charge, French	
818	1	802935-27	Pushbutton Charge, German	
818	1	802935-28	Pushbutton Charge, Spanish	
818	1	802935-29	Pushbutton Charge, Italian	
818	1	802935-30	Pushbutton Charge, Swedish	
818	1	802935-31	Pushbutton Charge, Danish	
818	1	802935-32	Pushbutton Charge, Portuguese	
818	1	802935-33	Pushbutton Charge, Norwegian	
818	1	802935-34	Pushbutton Charge, Dutch	
818	1	802935-45	Pushbutton Charge, Finnish	
818	1	802935-46	Pushbutton Charge, Polish	

(Continued on next page)

Standard Paddle Parts — Apex and Sternum *(continued)*

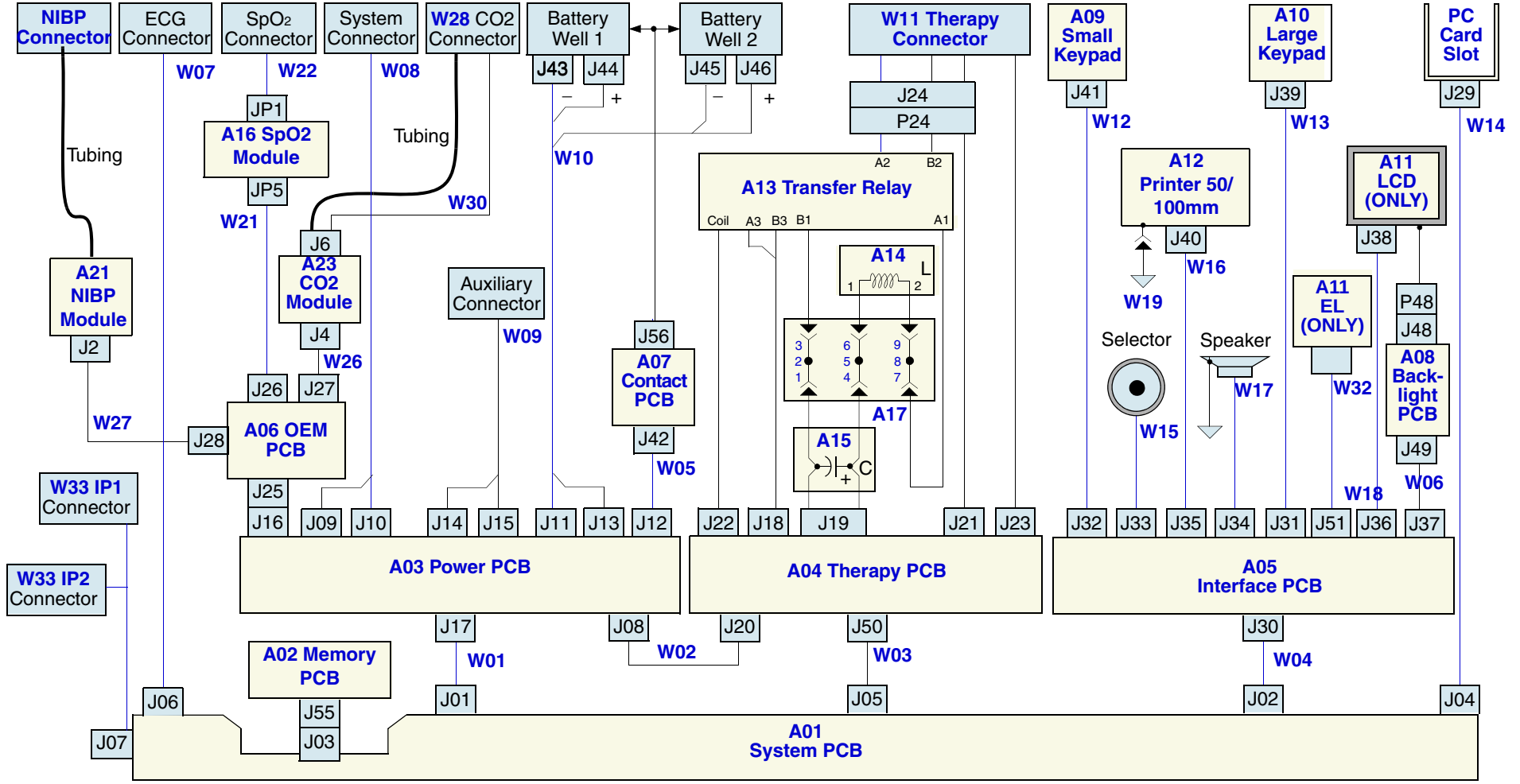
Item	Qty	MIN	Part Description	CAT.
819	1	802935-35	Pushbutton Print, English	21300-005281
819	1	802935-36	Pushbutton Print, French	21300-006558
819	1	802935-37	Pushbutton Print, German	
819	1	802935-38	Pushbutton Print, Spanish, Portuguese	
819	1	802935-39	Pushbutton Print, Italian	
819	1	802935-40	Pushbutton Print, Swedish	
819	1	802935-41	Pushbutton Print, Danish	
819	1	802935-42	Pushbutton Print, Norwegian	
819	1	802935-43	Pushbutton Print, Dutch	
819	1	802935-47	Pushbutton Print, Finnish	
819	1	802935-48	Pushbutton Print, Polish	
820	1	804268-030	Sternum Paddle Label, English	21501-000727
820	1	804268-14	Sternum Paddle Label, French	
820	1	804268-15	Sternum Paddle Label, German	
820	1	804268-16	Sternum Paddle Label, Spanish	

(Continued on next page)

Standard Paddle Parts — Apex and Sternum *(continued)*

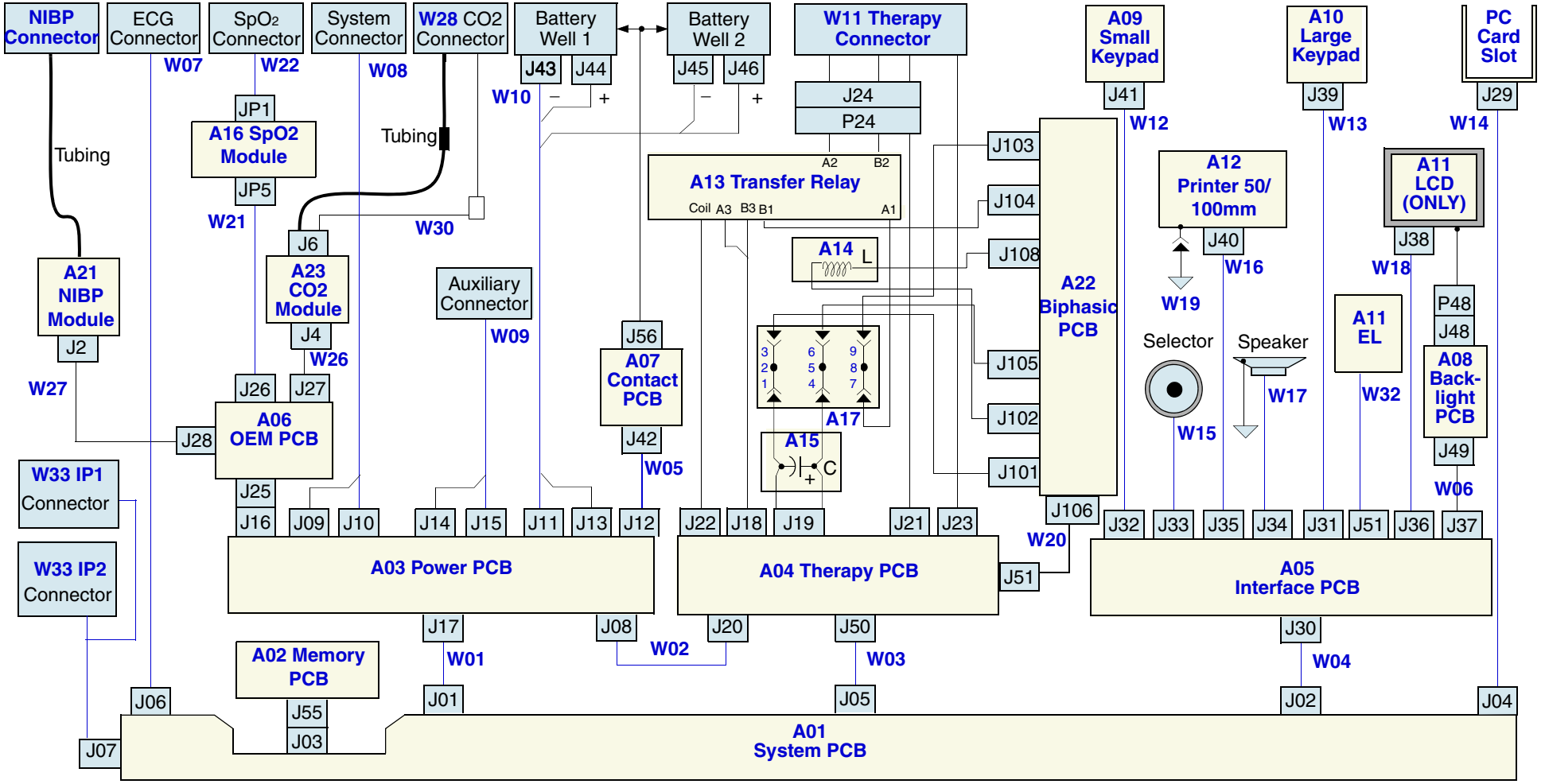
Item	Qty	MIN	Part Description	CAT.
820	1	804268-17	Sternum Paddle Label, Italian	
820	1	804268-18	Sternum Paddle Label, Swedish	
820	1	804268-19	Sternum Paddle Label, Danish	
820	1	804268-20	Sternum Paddle Label, Portuguese	
820	1	804268-21	Sternum Paddle Label, Norwegian	
820	1	804268-22	Sternum Paddle Label, Dutch	
820	1	804268-23	Sternum Paddle Label, Finnish	
820	1	804268-24	Sternum Paddle Label, Polish	
821	1	804267-04	Apex Paddle Label, English, French, German, Swedish, Danish, Dutch	21501-000416
821	1	804267-05	Apex Paddle Label, Spanish, Portuguese, Italian	
821	1	804267-06	Apex Paddle Label, Norwegian	
821	1	804267-07	Apex Paddle Label, Finnish	
821	1	804267-08	Apex Paddle Label, Polish	21501-000417
822	1	805241-00	LED Grommet	21300-002605

Interconnect Drawing – Monophasic Devices Only **(Biphasic Next Page)**



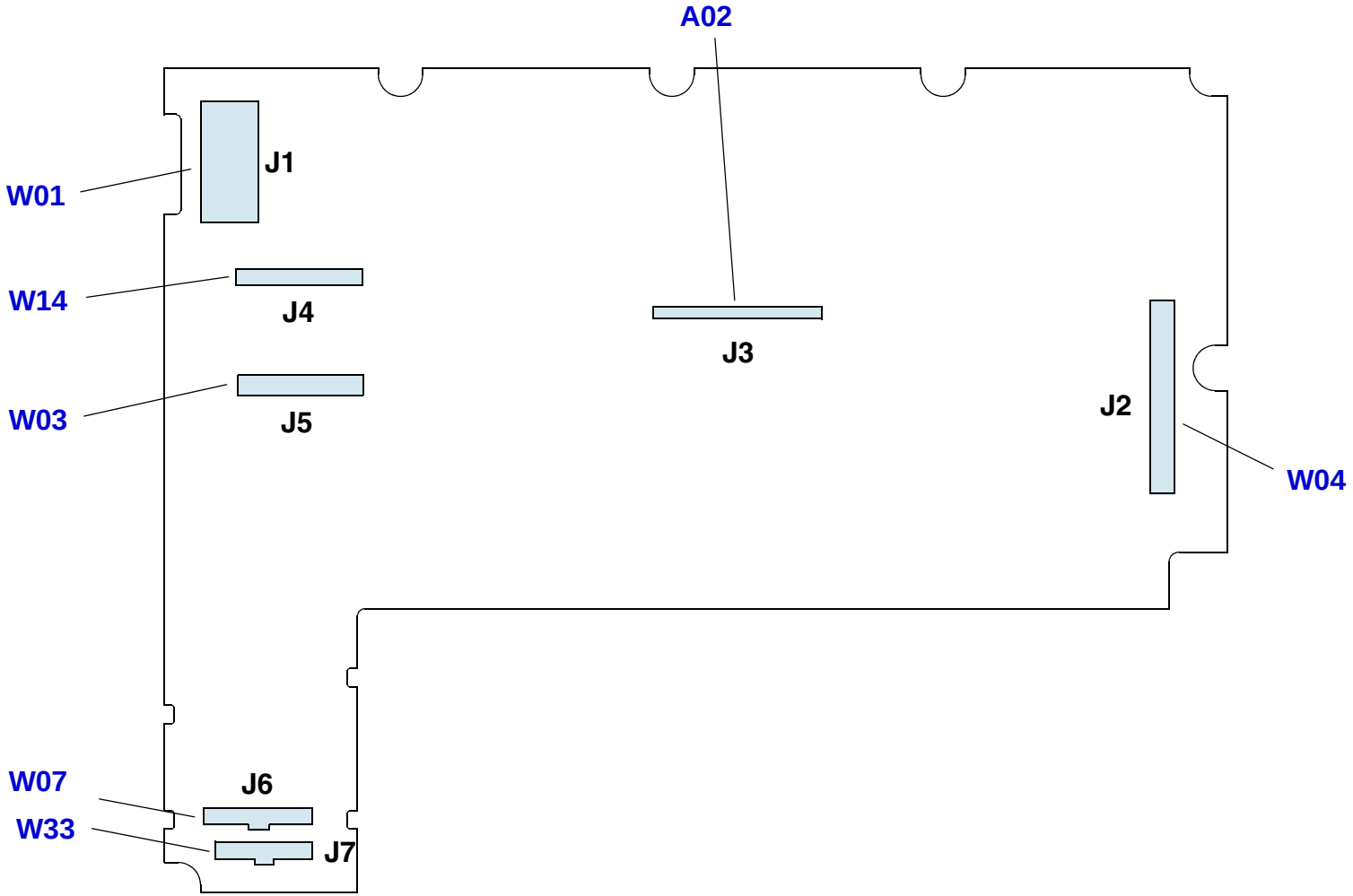
747

Interconnect Drawing – Biphasic Devices Only **(Monophasic Previous Page)**



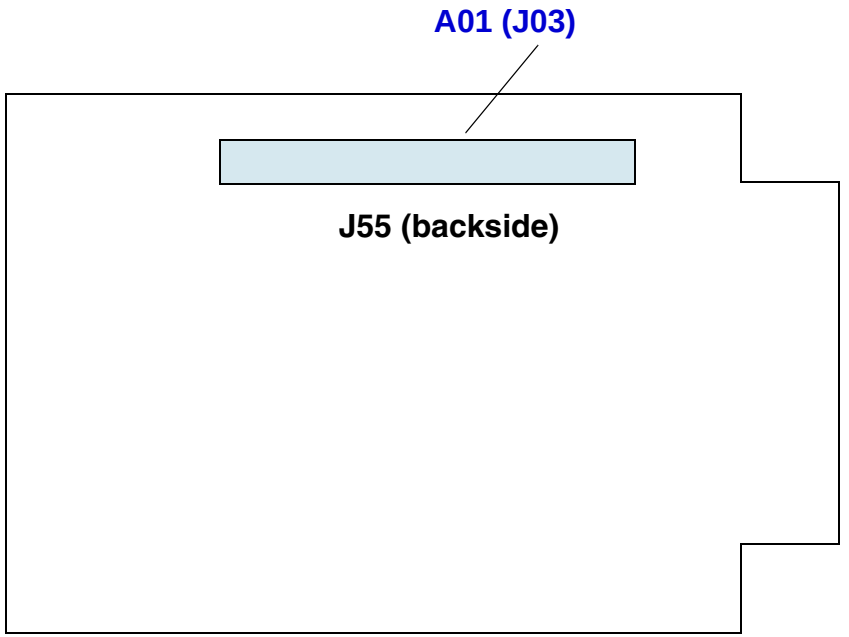
748

A01 System PCB, MIN 3006227-08

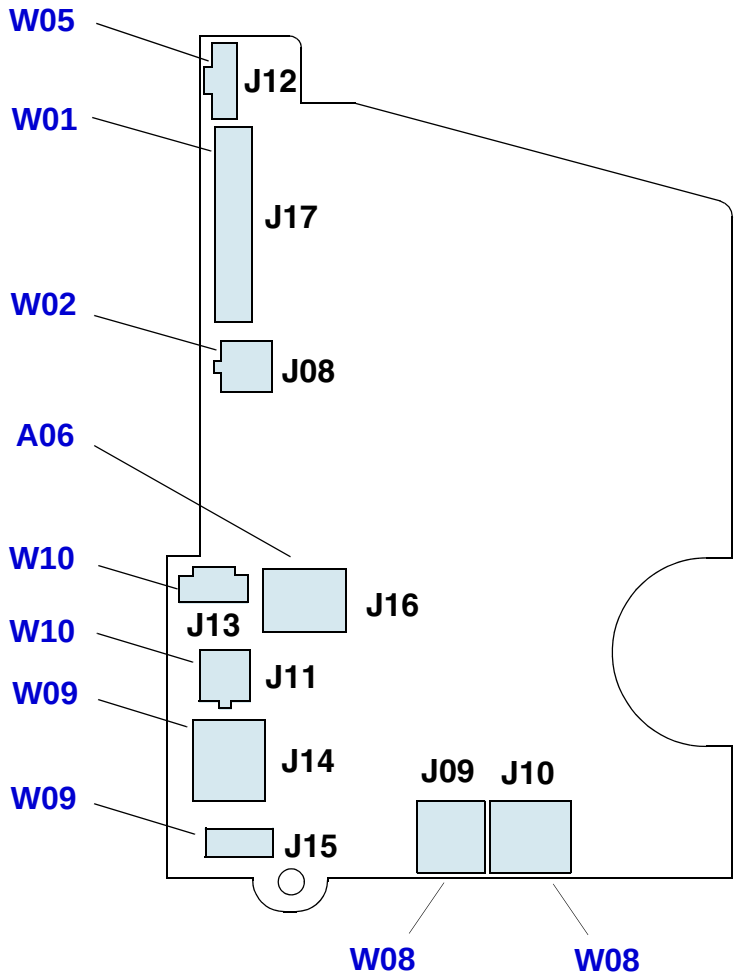


749

A02 Memory PCB, MIN 3008520-07

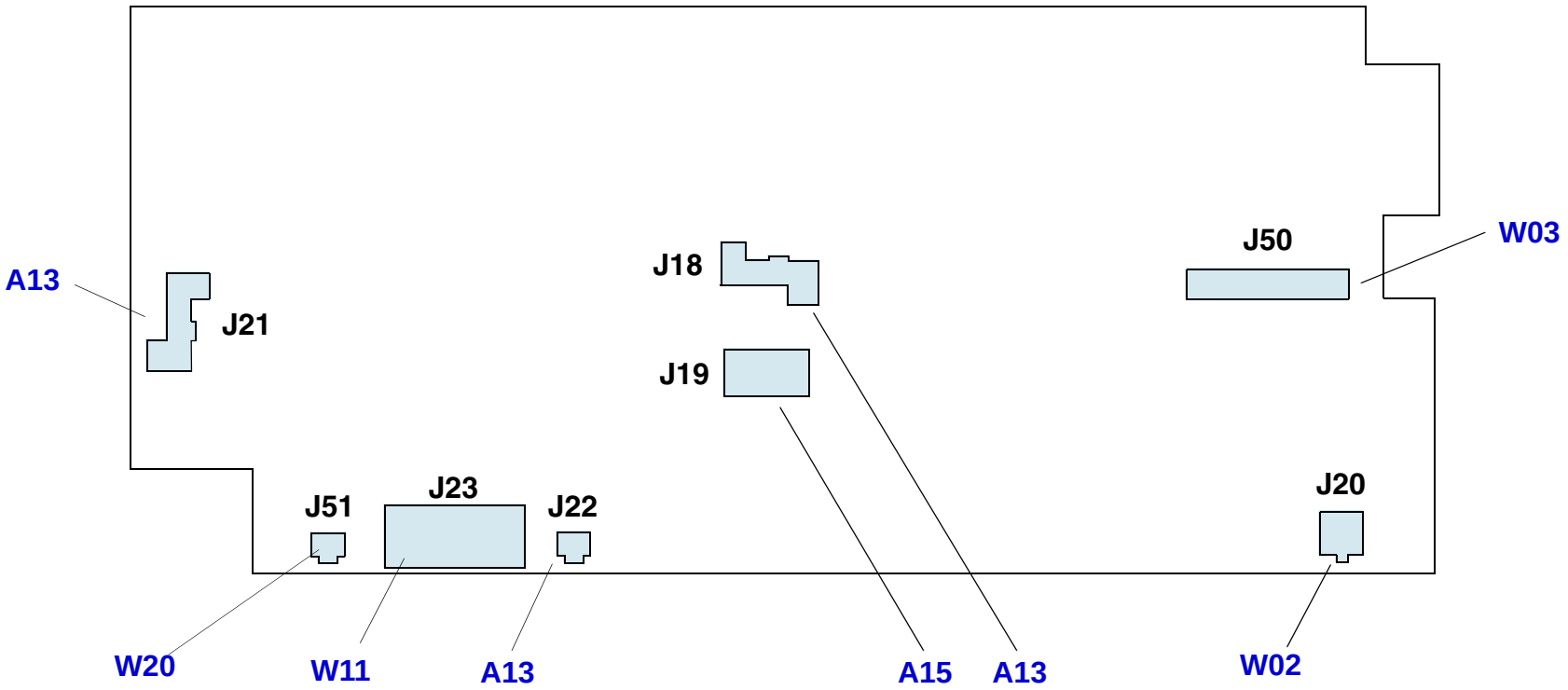


A03 Power PCB, MIN 3006237-009



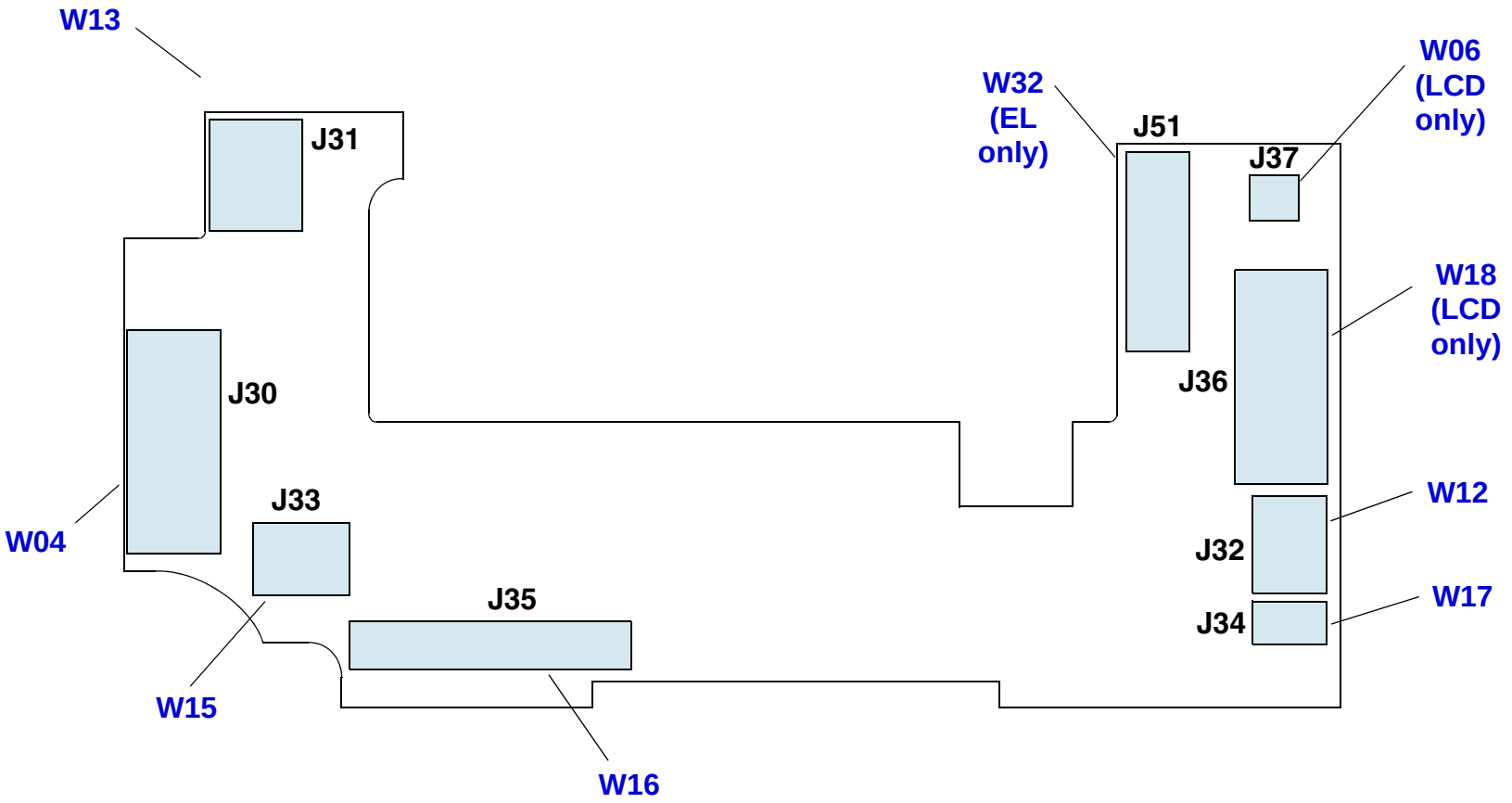
751

A04 Therapy PCB, MIN 3006235-012 – Monophasic Devices
A04 Therapy PCB, MIN 3006235-014 – Biphasic Devices



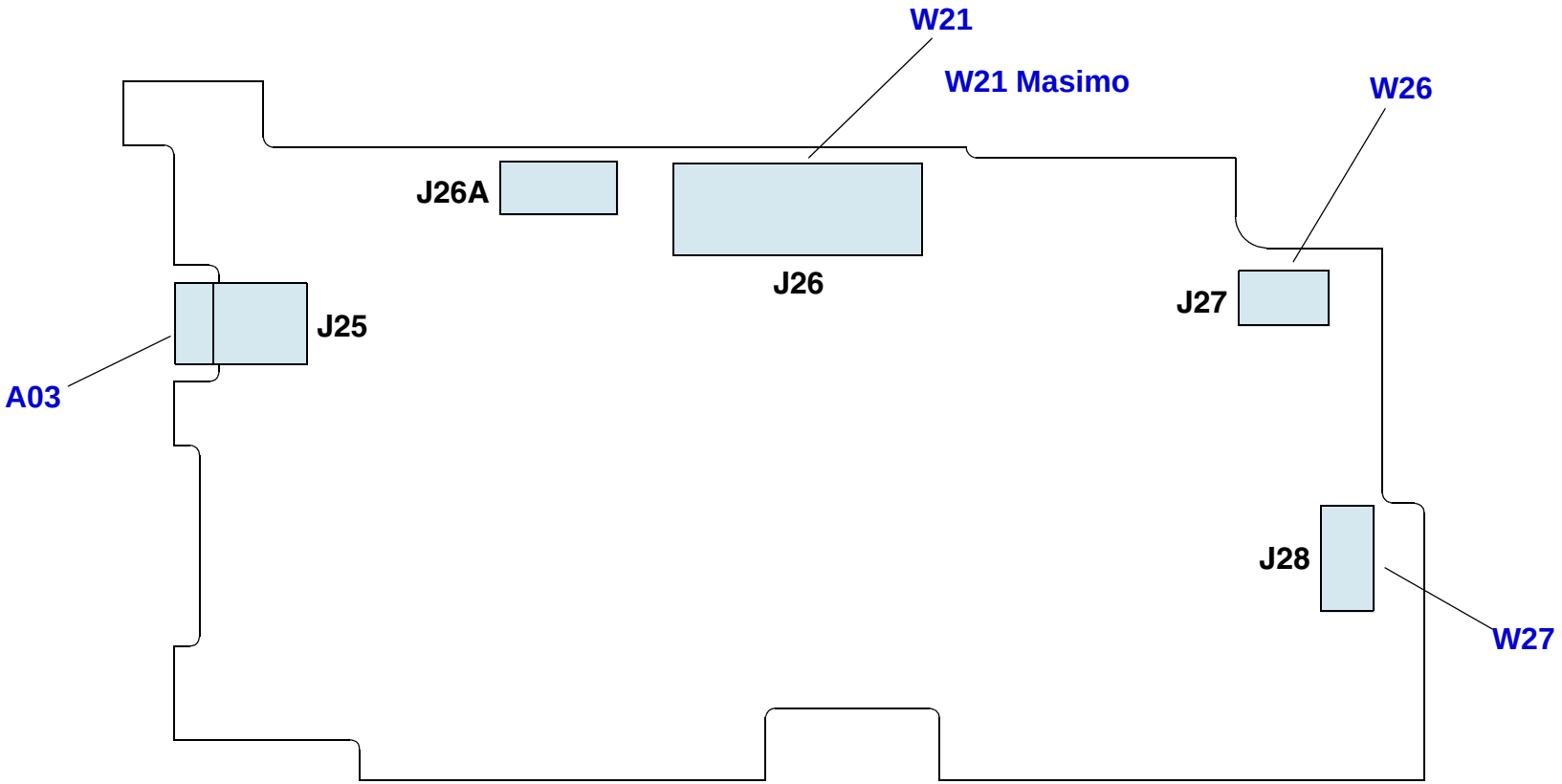
752

A05 Interface PCB, MIN 3010524-04



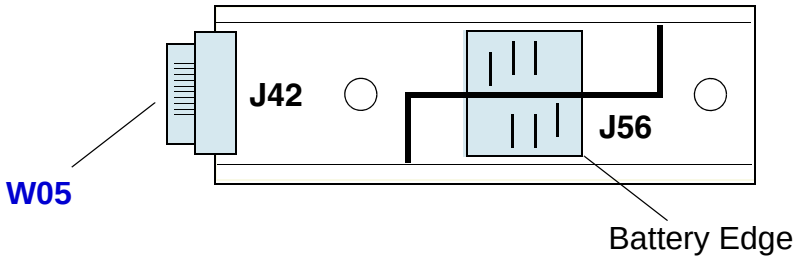
753

A06 OEM PCB Module, MIN 3008541-009



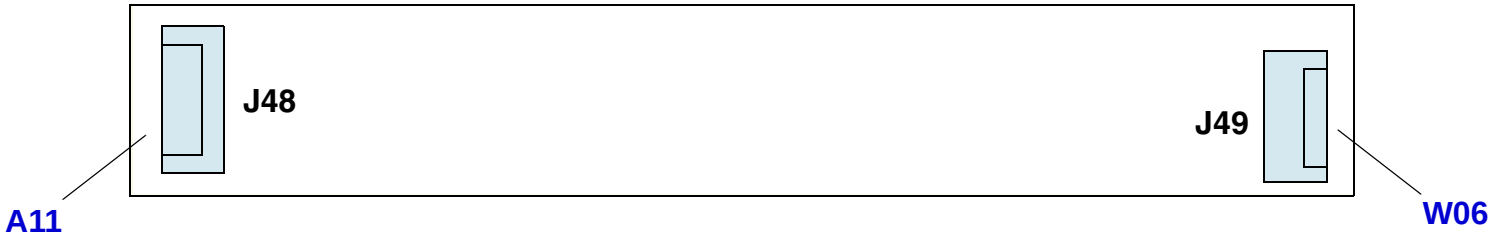
754

A07 Contact PCB Module, MIN 3006394-02

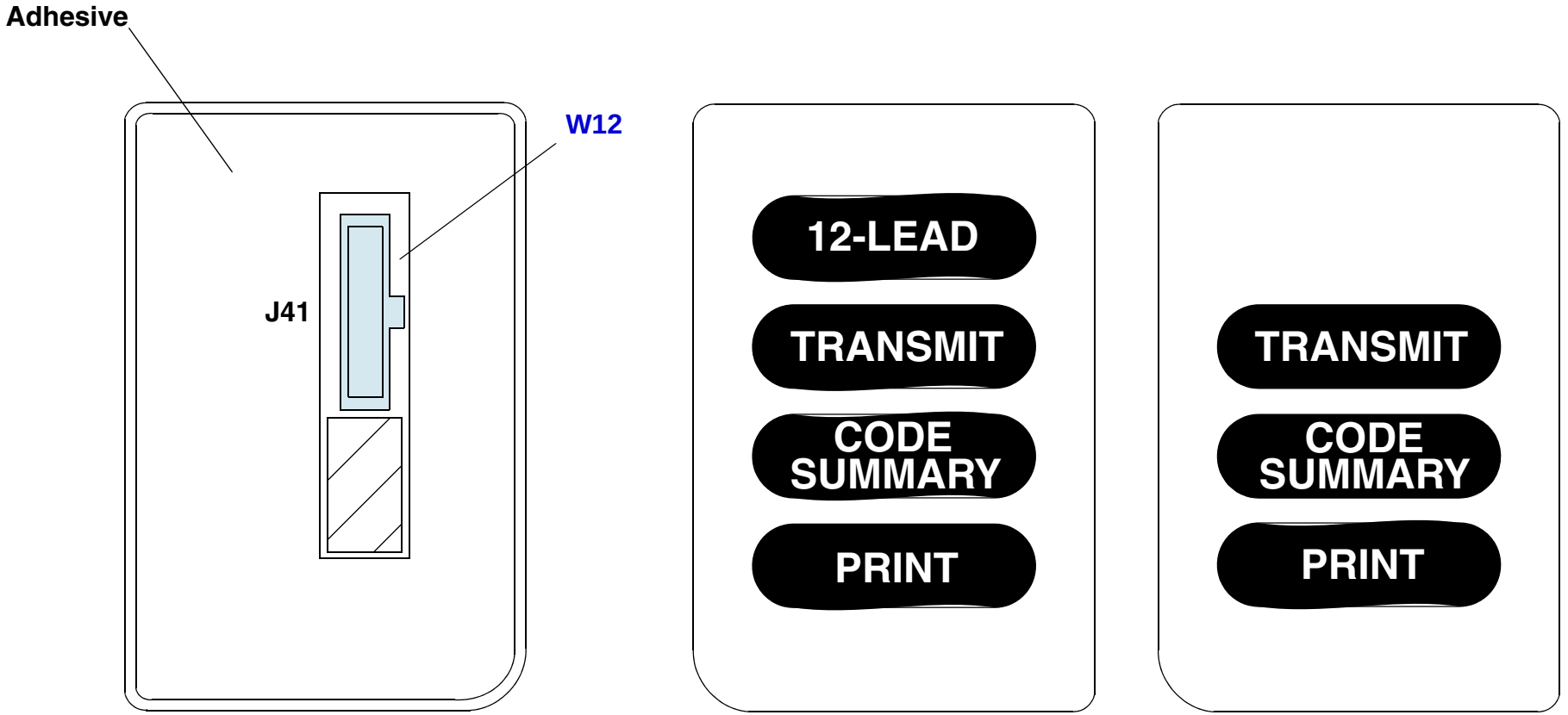


755

A08 Backlight PCB, MIN 3006806-00 – LCD Only



A09 Small Keypad, Various MINs



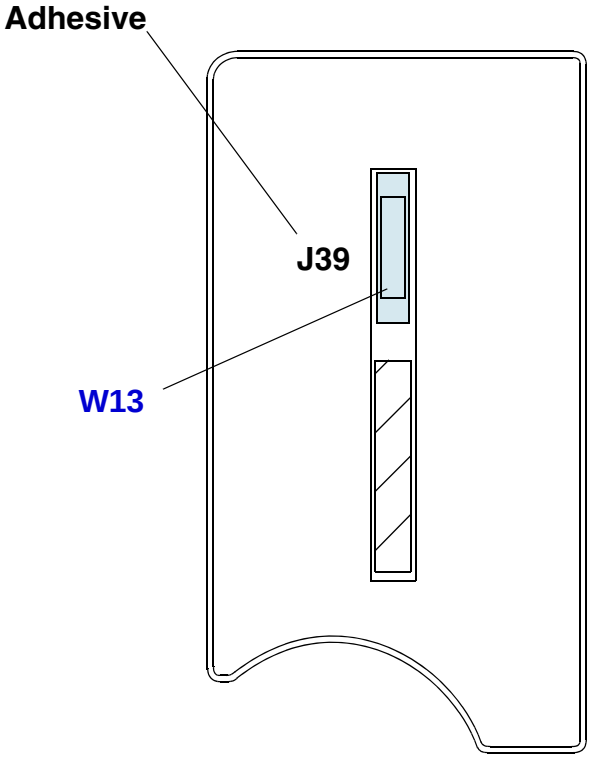
Rear View

12-Lead Configuration

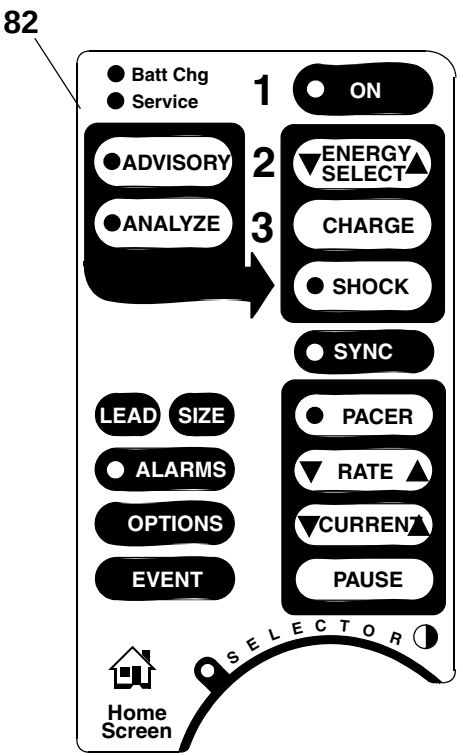
3-Lead Configuration Standard

757

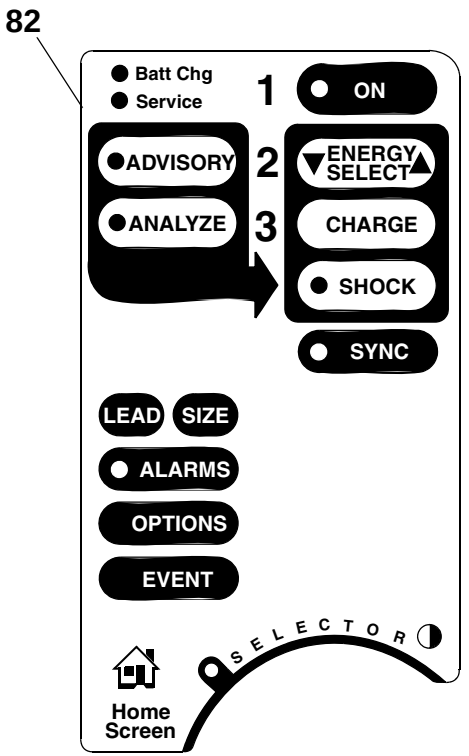
A10 Large Keypad, Various MINs



Rear View



With Pacer
No NIBP
With Advisory



No Pacer
No NIBP
With Advisory

758

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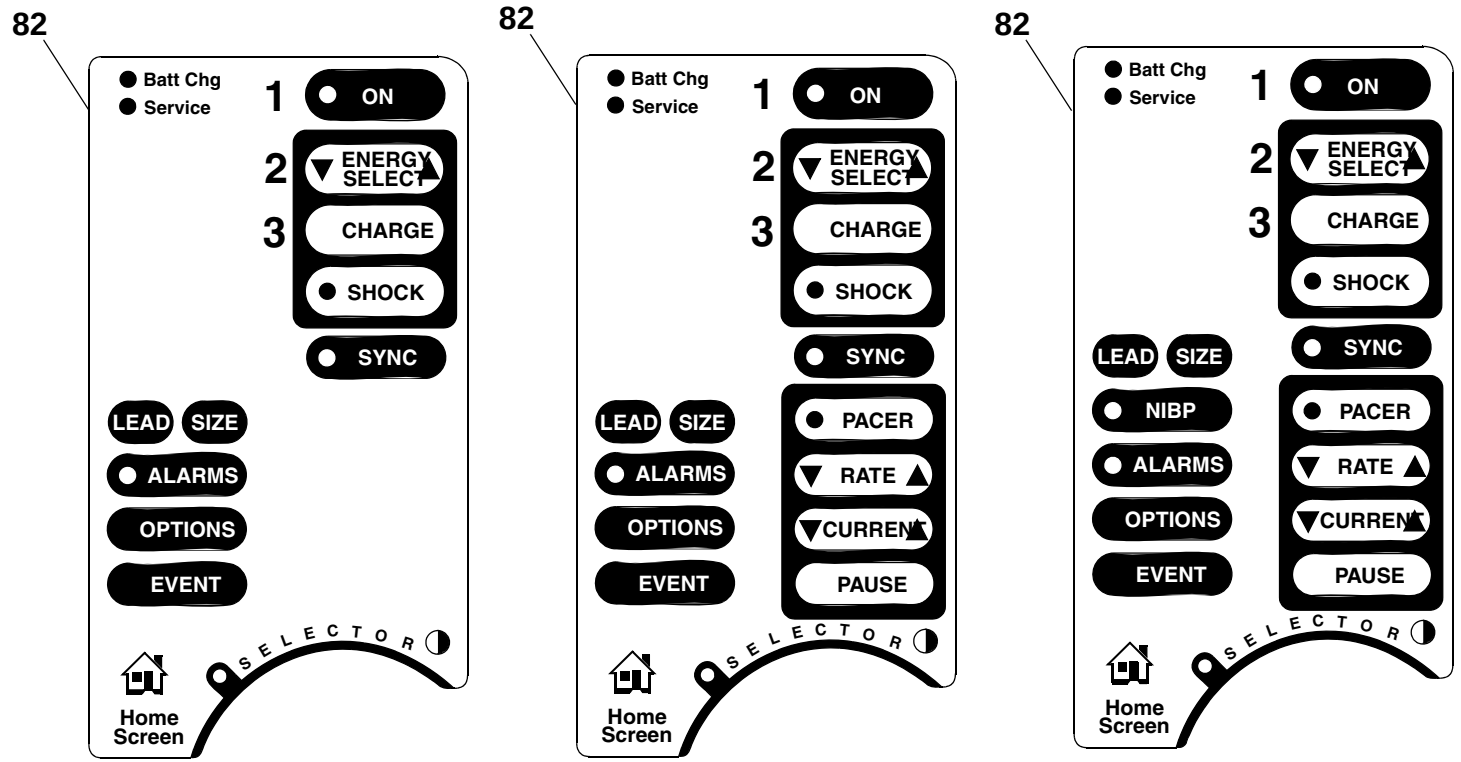
A10 Large Keypad *(continued)*



No Pacer
No NIBP
No Advisory

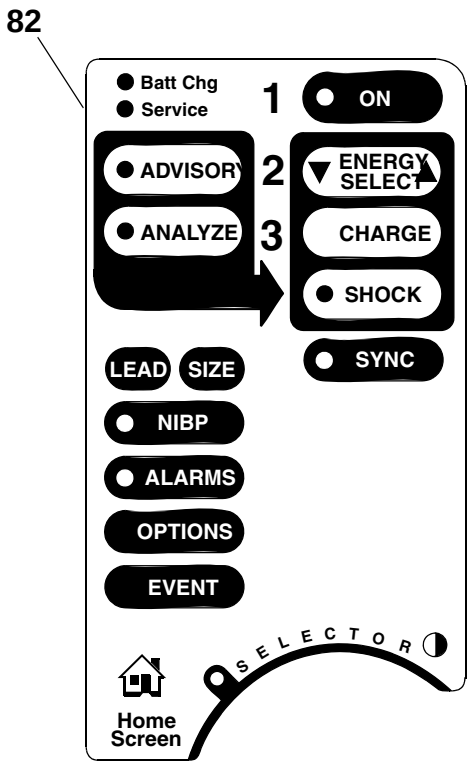
With Pacer
No NIBP
No Advisory

With Pacer
With NIBP
No Advisory

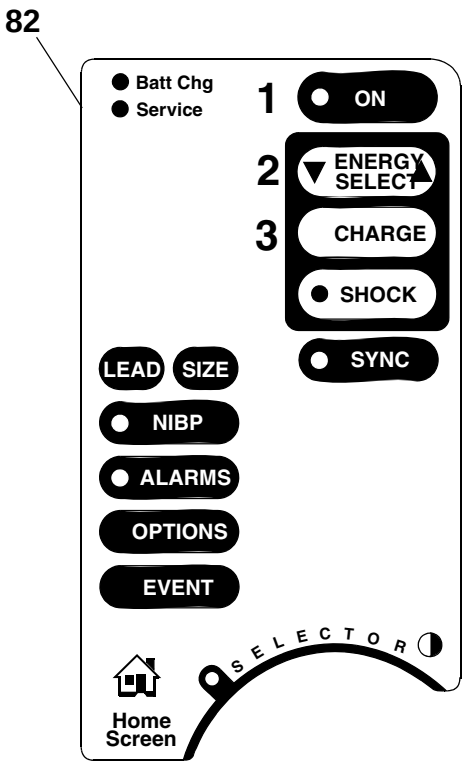
759

(Continued on next page)

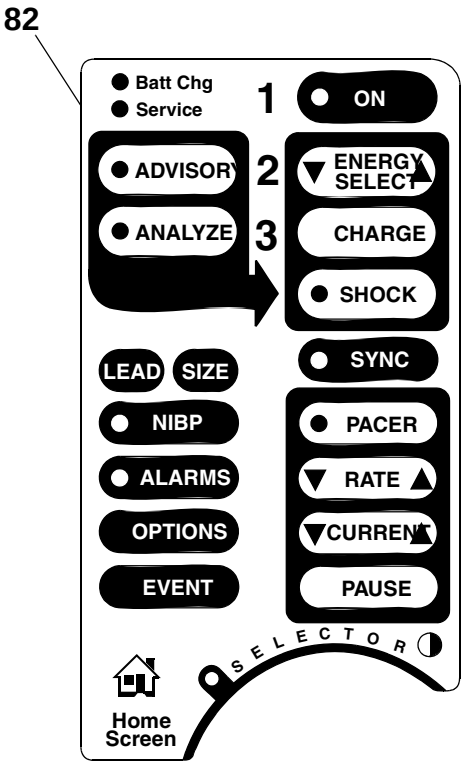
A10 Large Keypad *(continued)*



No Pacer
With NIBP
With Advisory



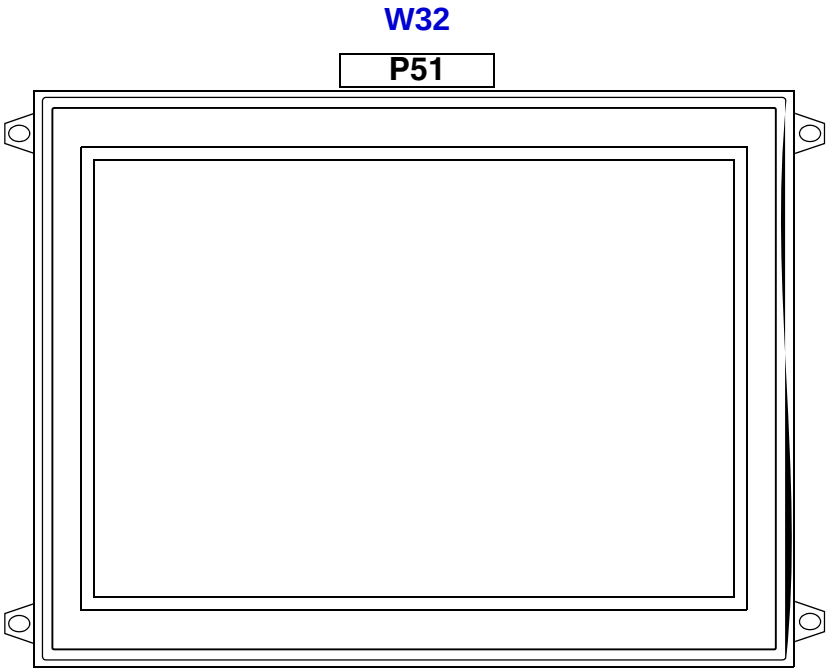
No Pacer
With NIBP
No Advisory



With Pacer
With NIBP
With Advisory

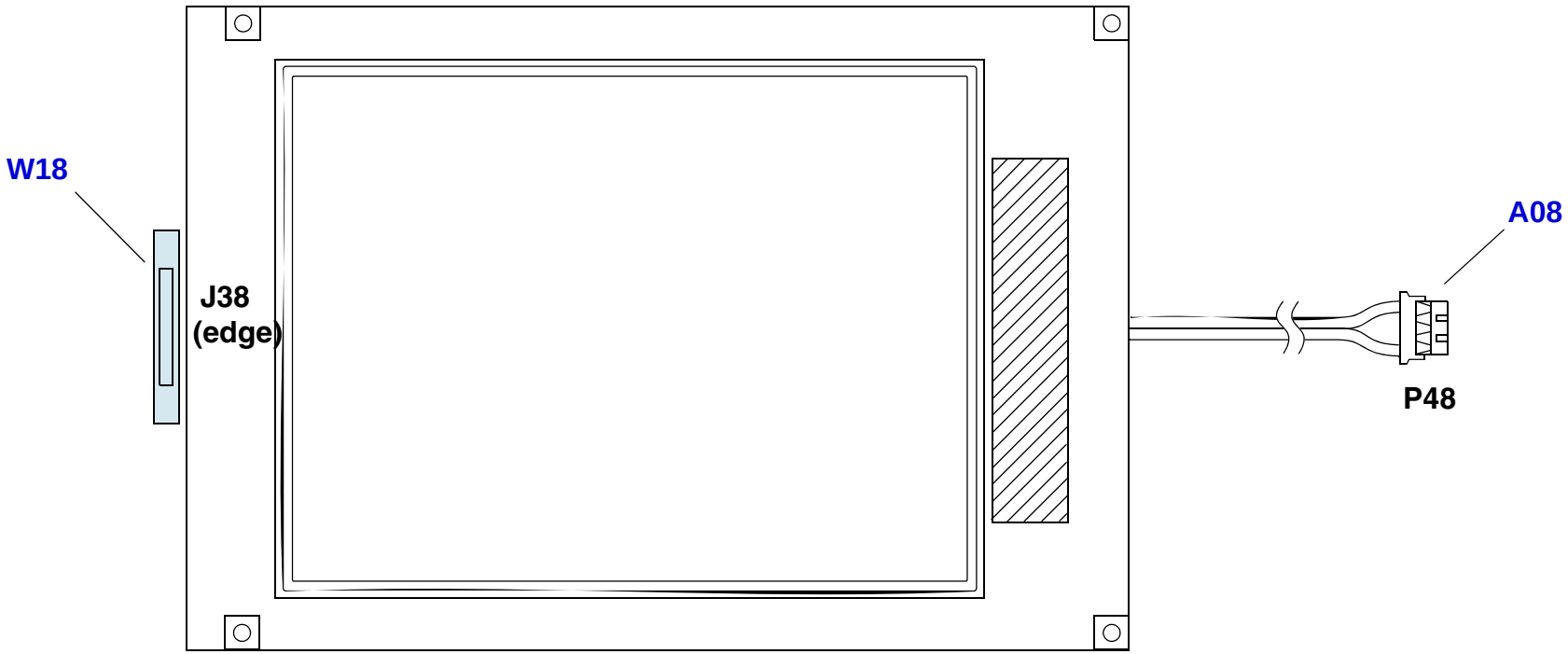
760

A11 EL Display Assembly, MIN 3012695-000



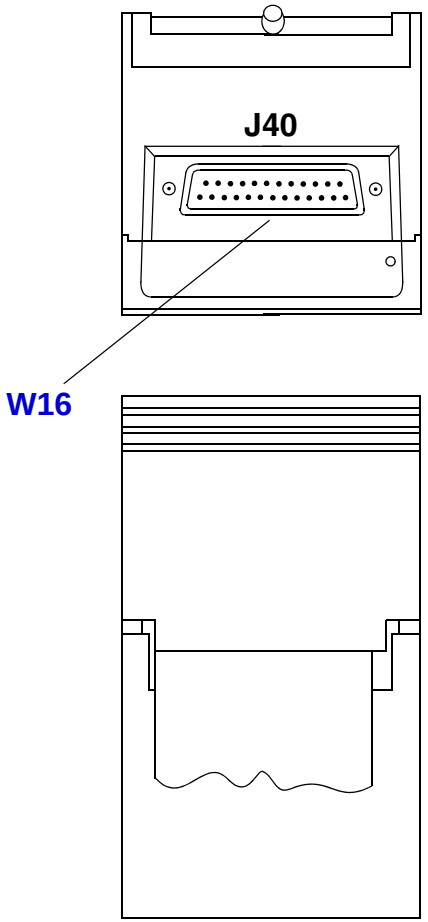
761

A11 LCD Assembly, MIN 3010612-00

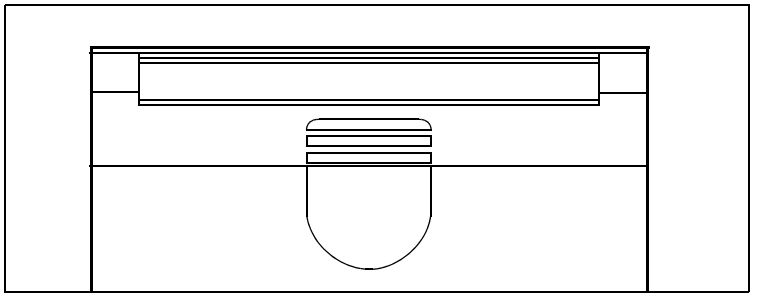


762

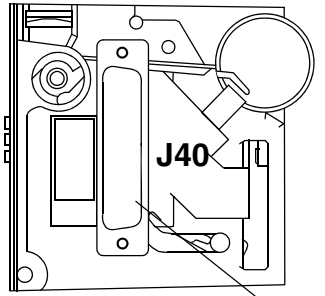
A12 Printer Assembly, Various MINs



50 mm Thermal Printer



100 mm Thermal Printer



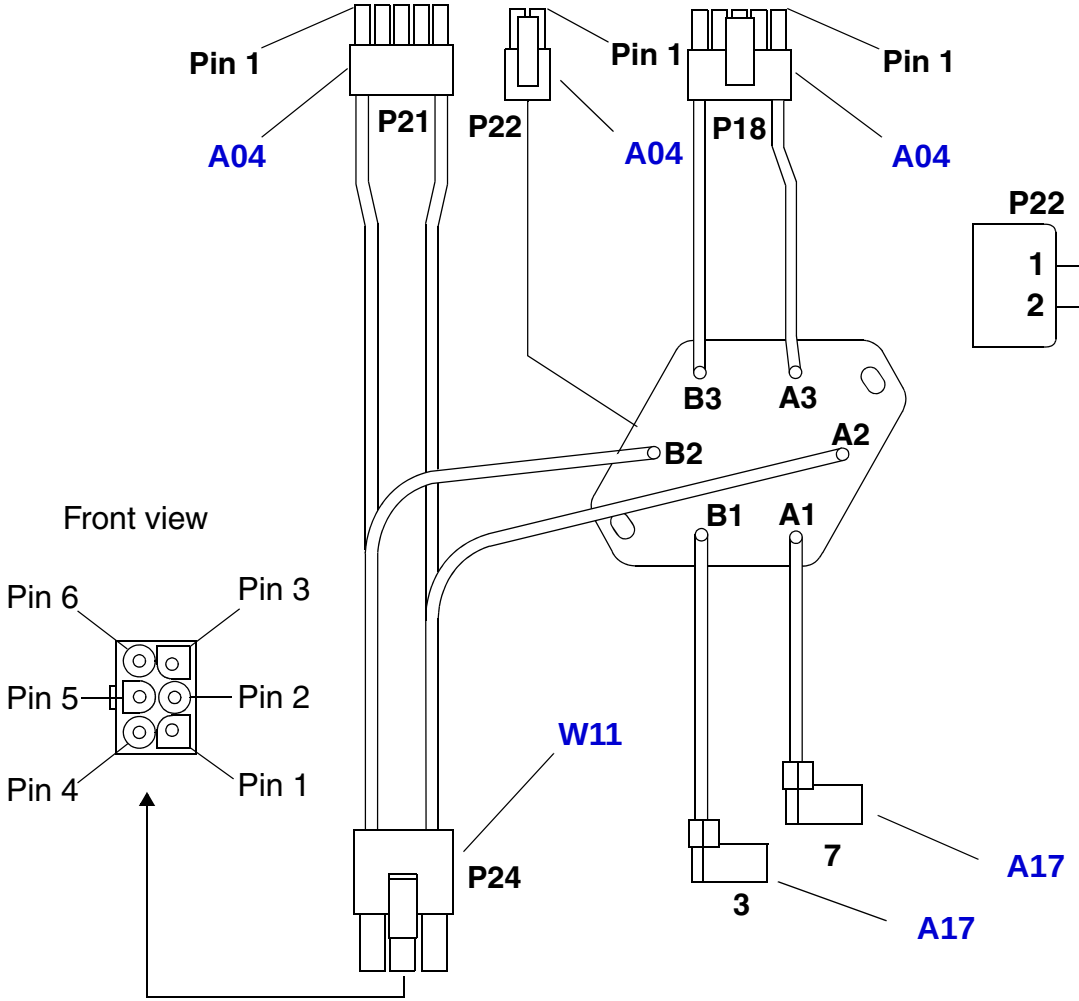
W16

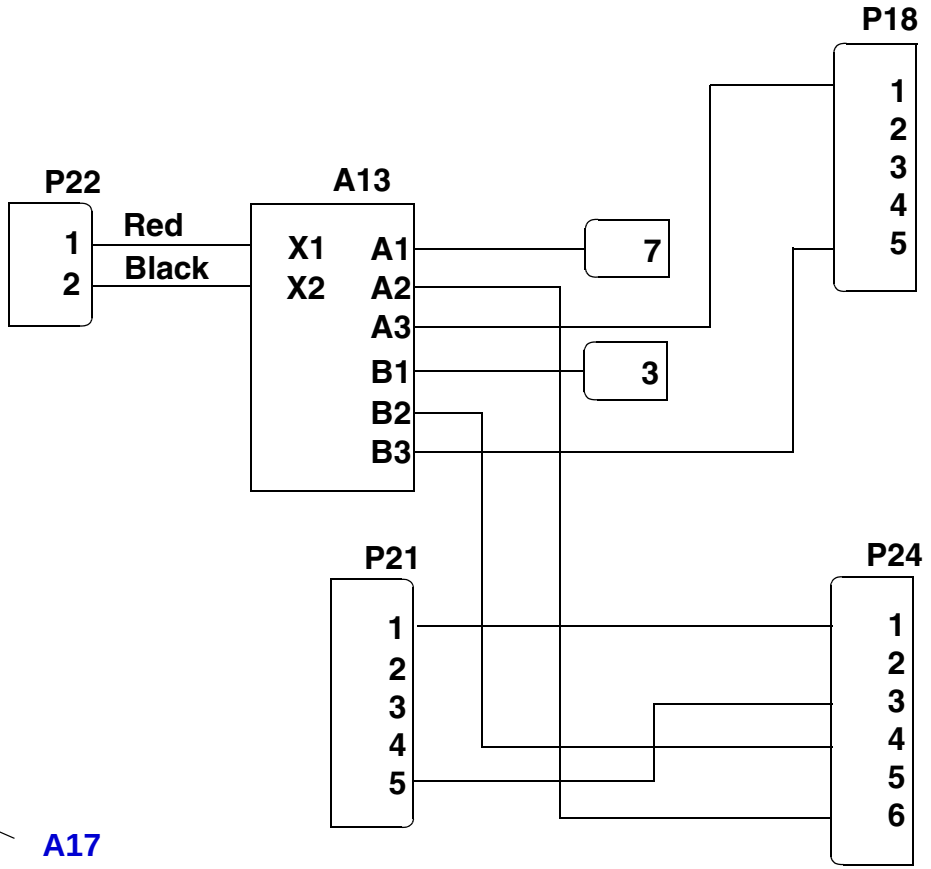
View 50 mm printer parts

View 100 mm printer parts

763

A13 Transfer Relay Assembly, MIN 3006219-01– Monophasic Devices



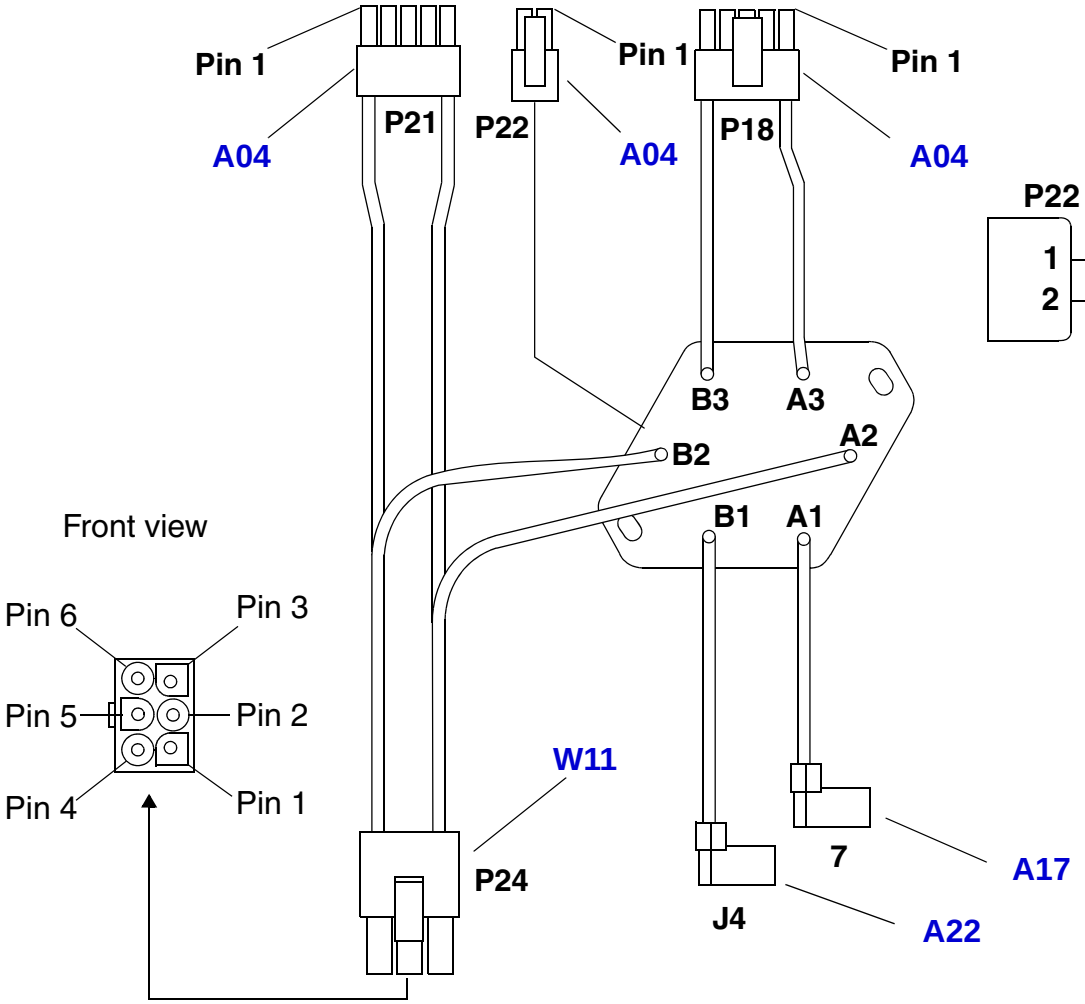


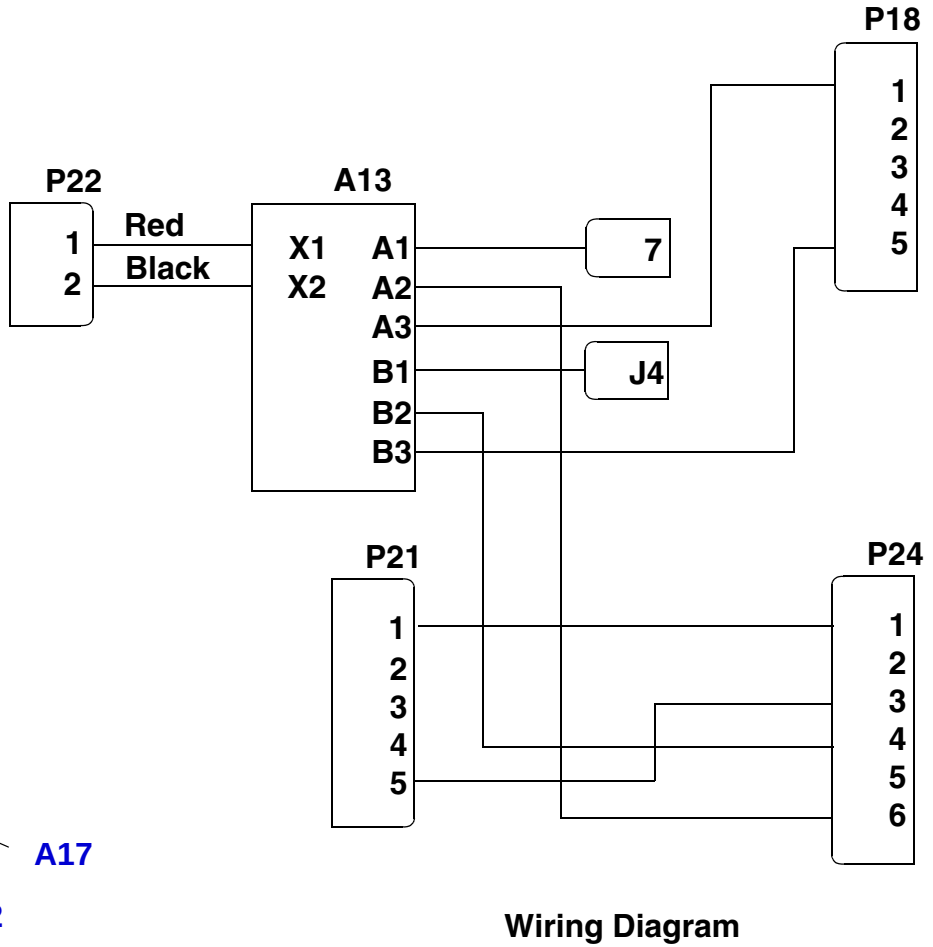
Wiring Diagram

764

(Continued on next page)

A13 Transfer Relay Assembly, MIN 3201583-000 – Biphasic Devices

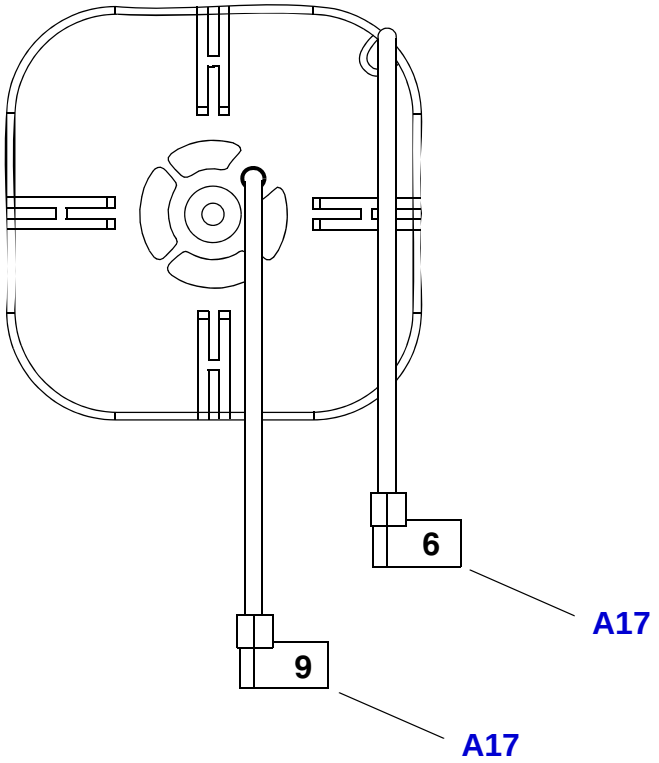




Wiring Diagram

765

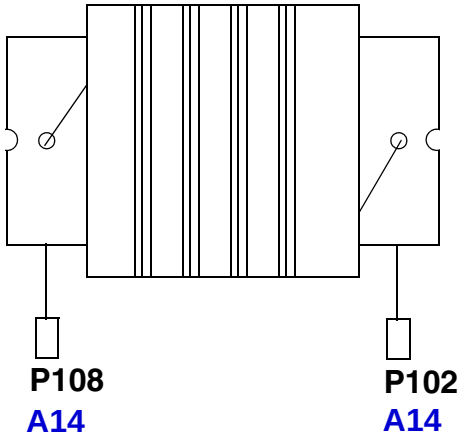
A14 Waveshaping Inductor, MIN 3006221-01– Monophasic Devices



766

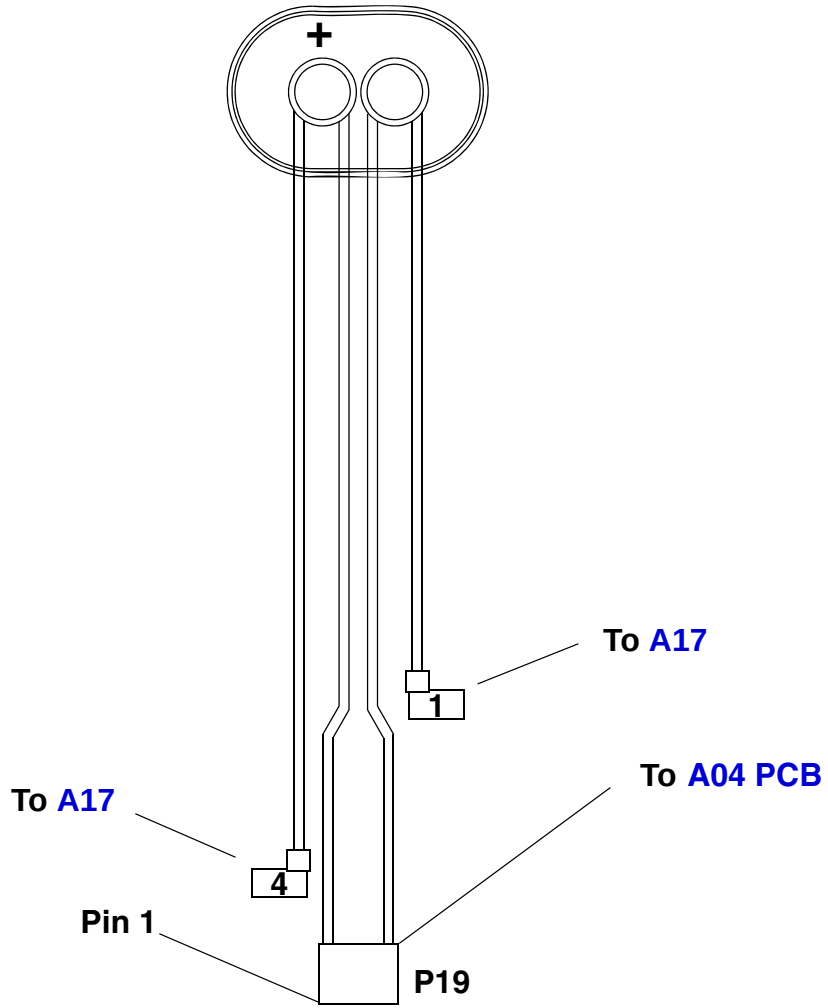
(Continued on next page)

A14 Inductive Resistor, MIN 3010212-02 – Biphasic Devices



767

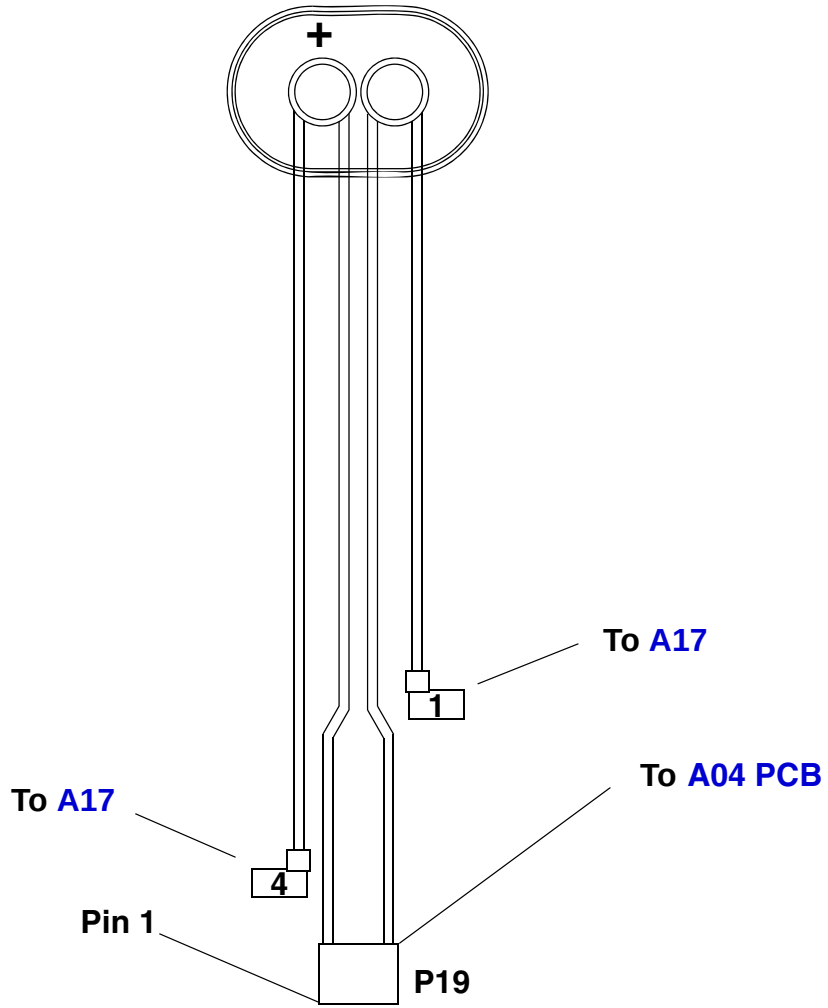
A15 Energy Storage Capacitor, MIN 3006220-01 – Monophasic Devices



768

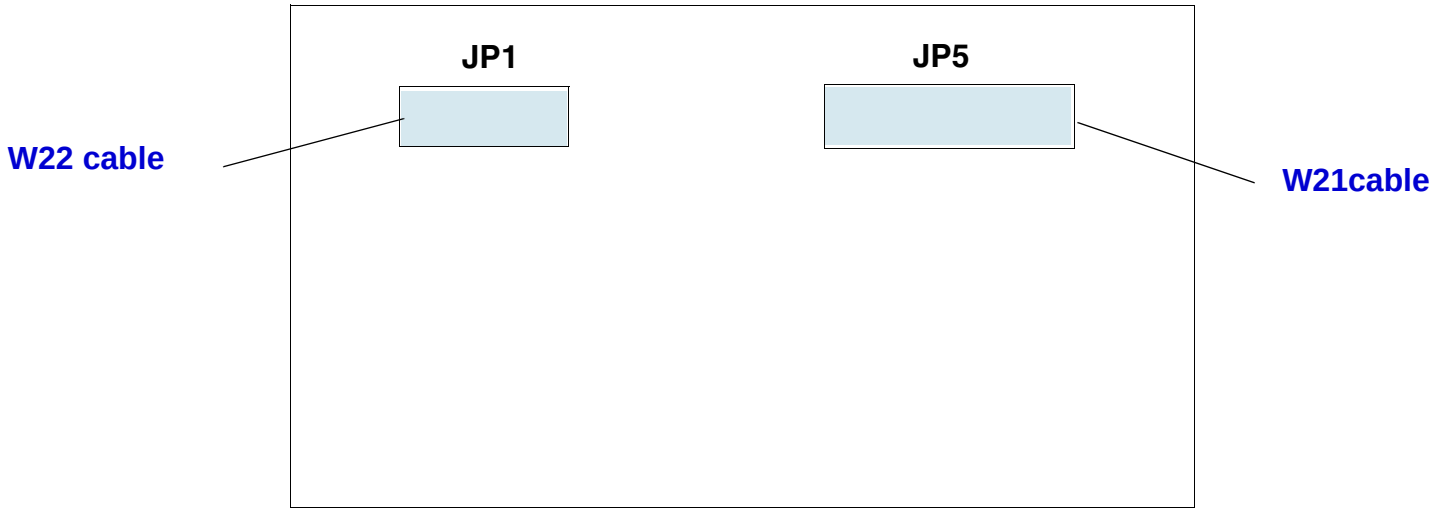
(Continued on next page)

A15 Energy Storage Capacitor, MIN 3008164-002 – Biphasic Devices



769

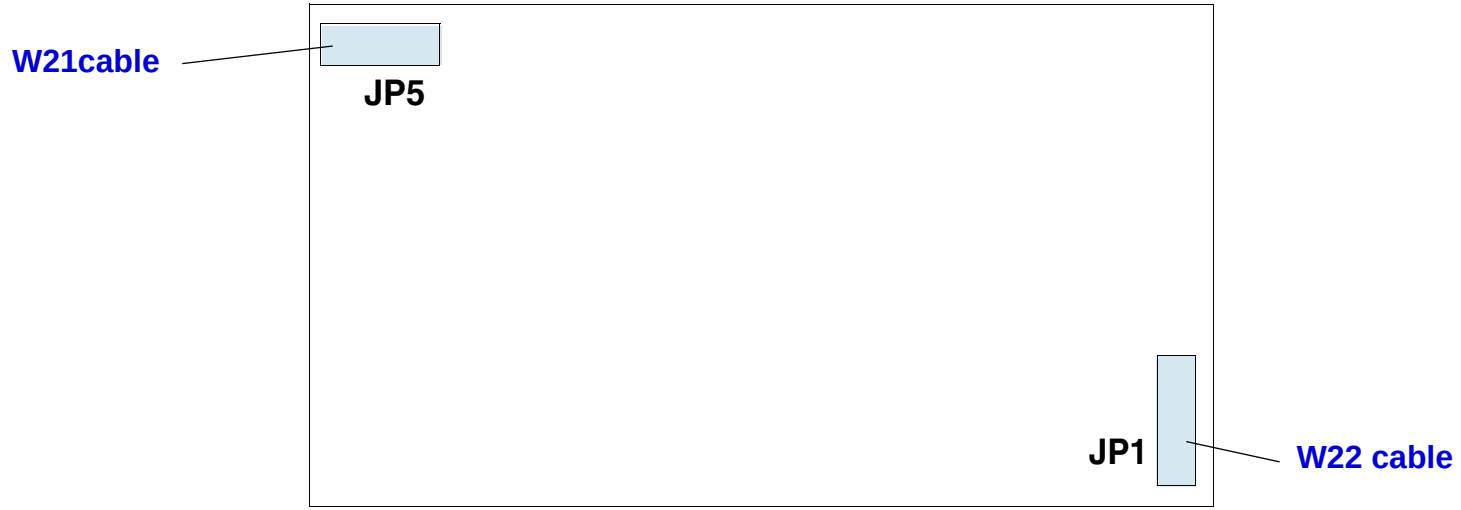
A16 SpO2 Module – Nellcor, MIN 3008538-000



770

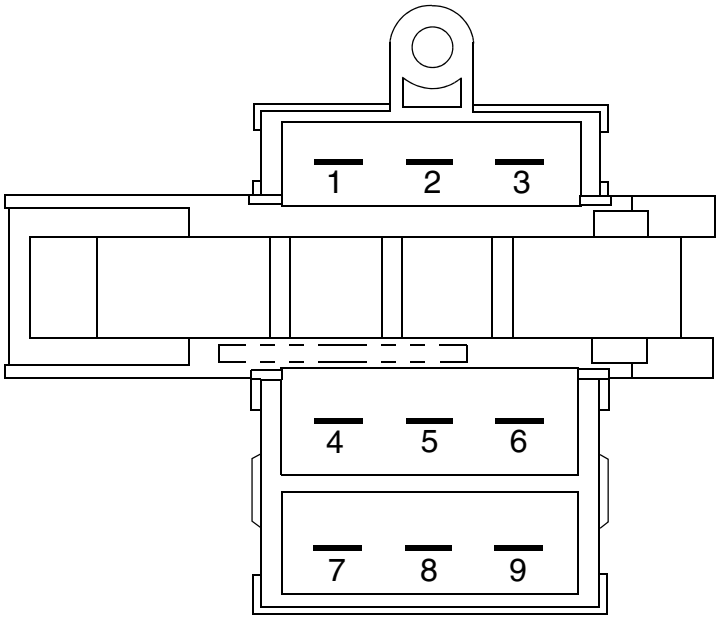
(Continued on next page)

A16 SpO2 Module – Masimo, MIN 3203421-001



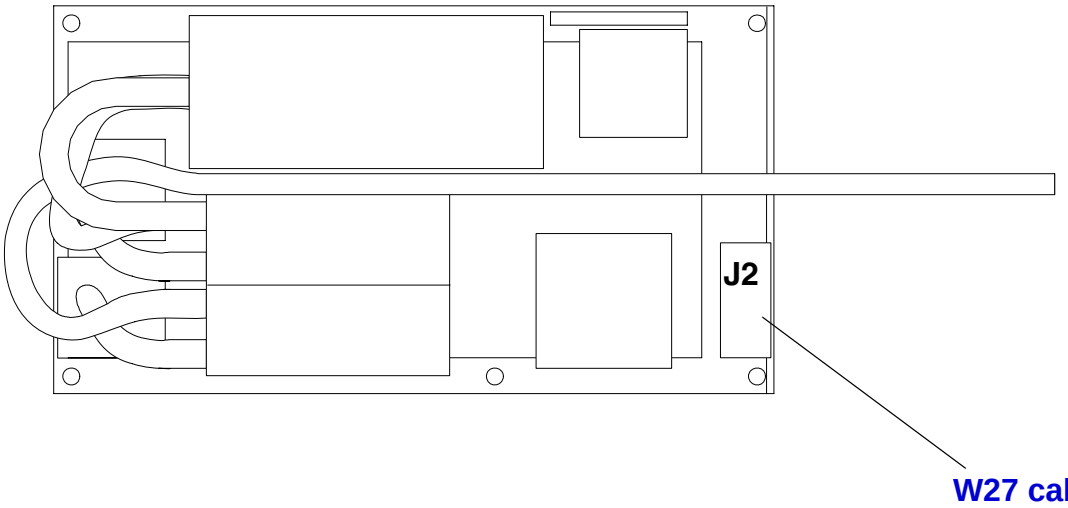
771

A17 Interconnect Bracket, MIN 3008897-002



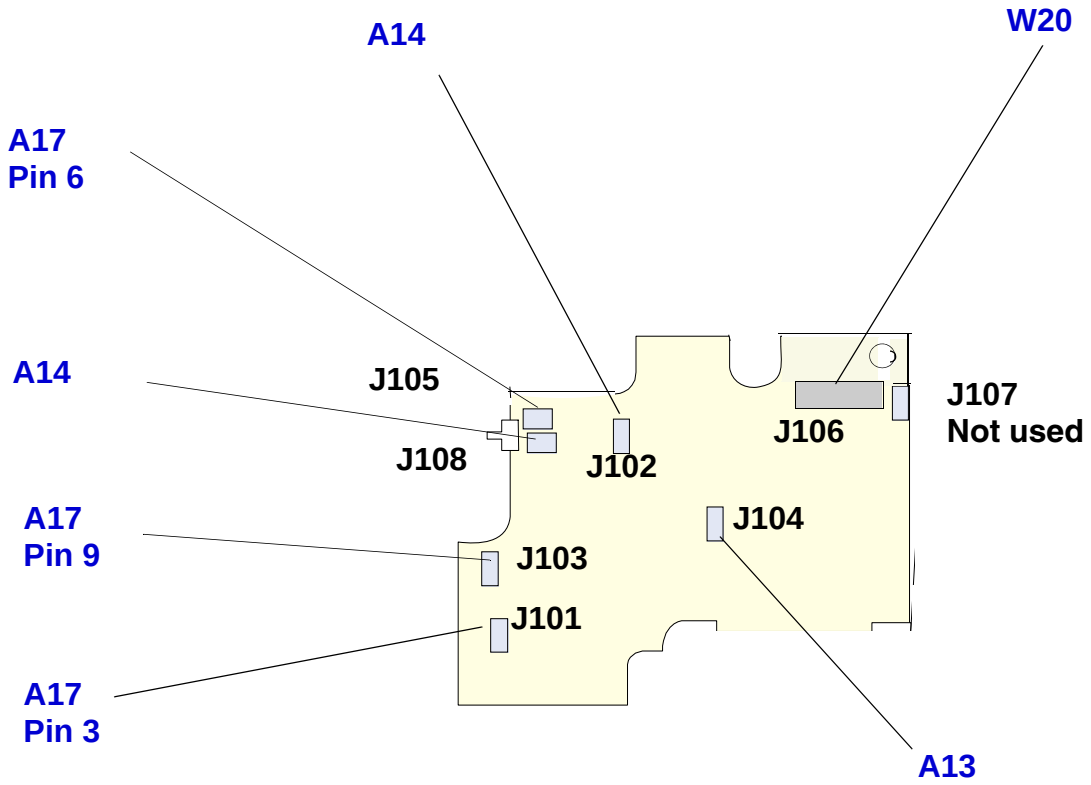
772

A21 NIBP PCB Module, MIN 3008943-000



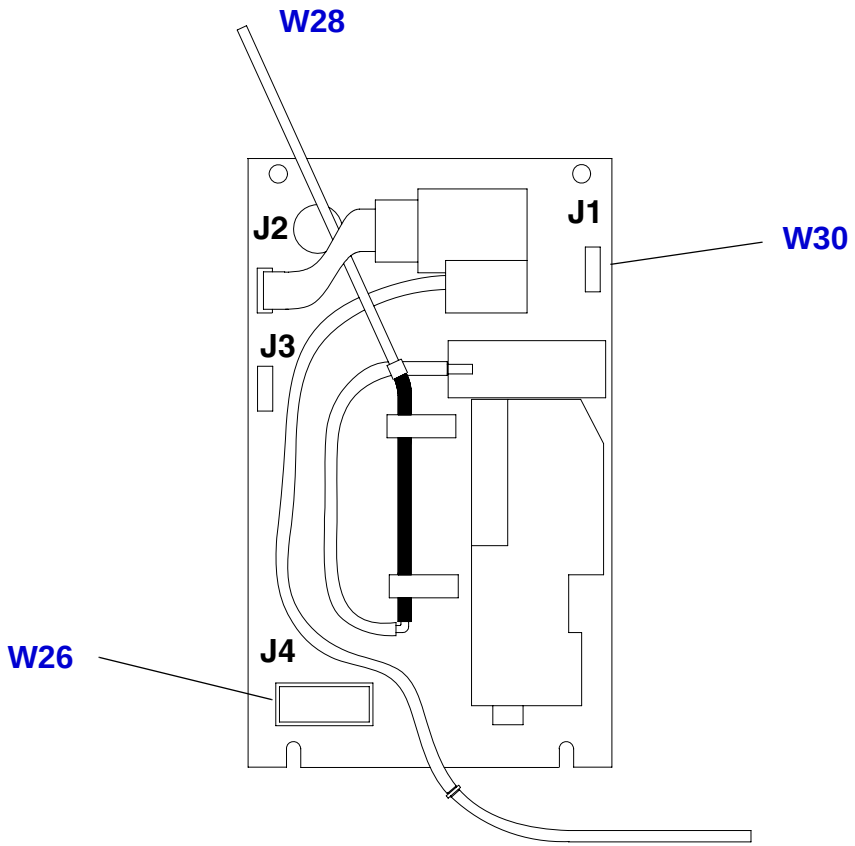
773

A22 Biphasic PCB, MIN 3010178-012



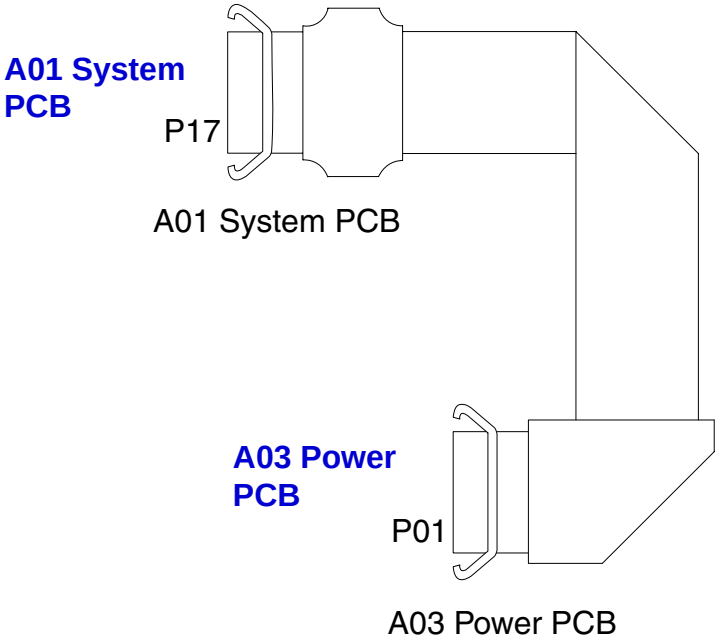
774

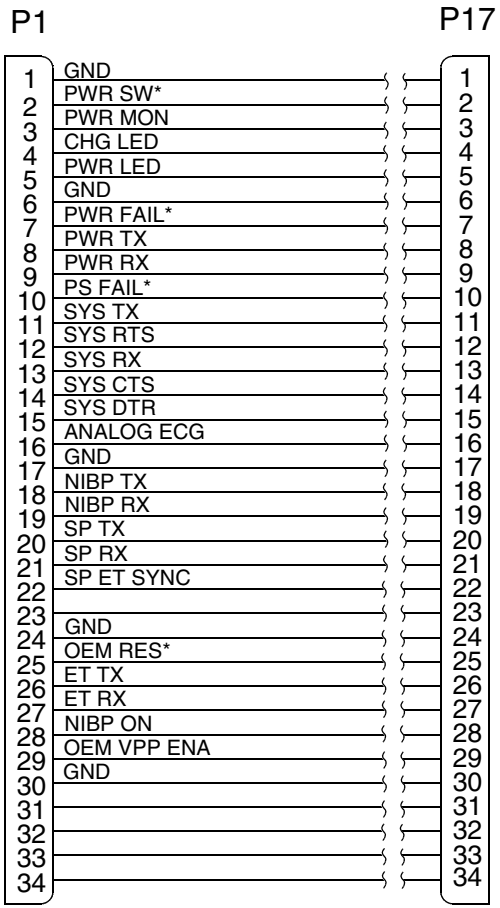
A23 CO2 PCB Module, MIN 3012140-005



775

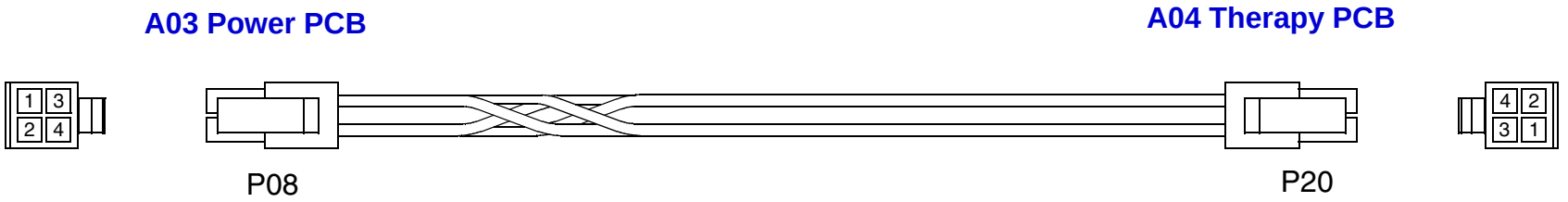
W01 Power PCB/System PCB Cable, MIN 3009677-05

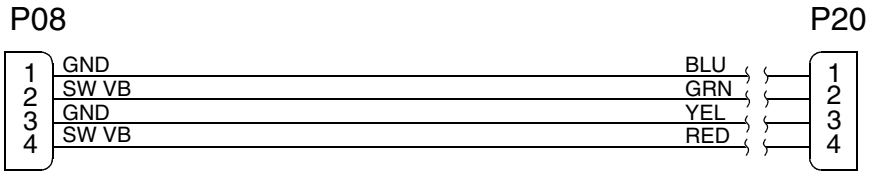




776

W02 Power PCB/Therapy PCB Cable, MIN 3009726-05

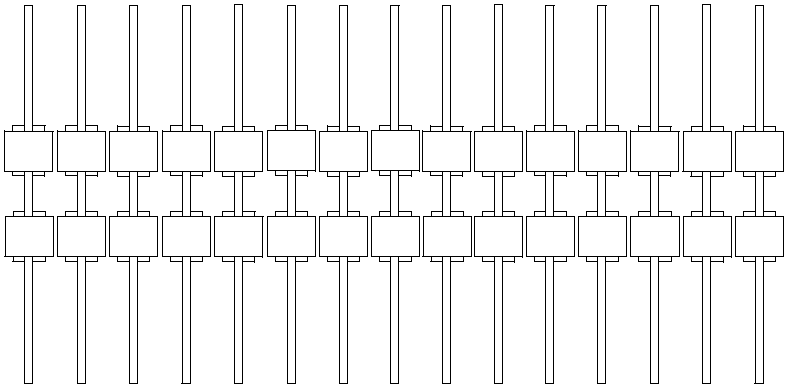




777

W03 System PCB/Therapy PCB Connector, MIN 3009878-002

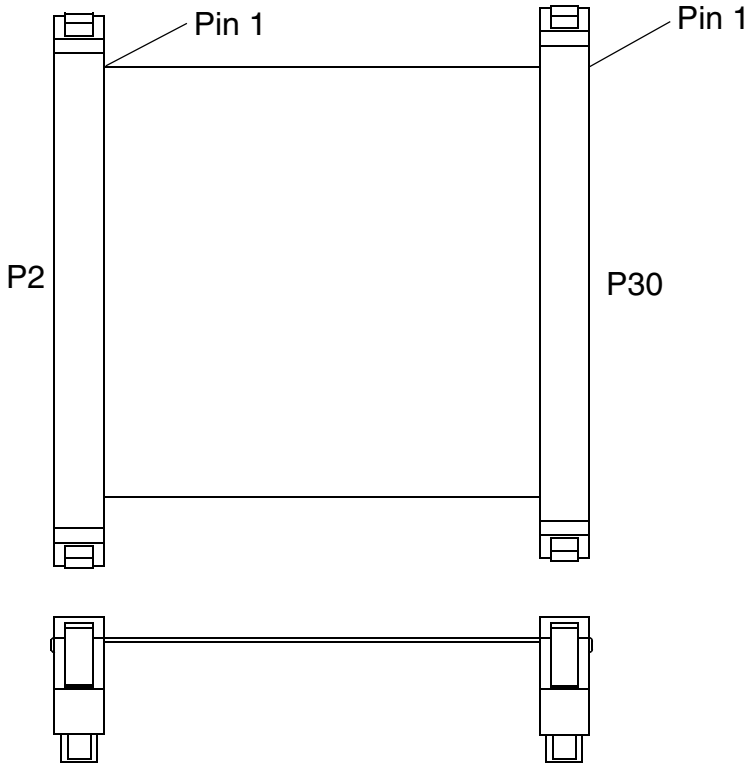
A01 System PCB



A04 Therapy PCB

W04 System PCB/Interface PCB Cable, MIN 3009677-01

A01 System PCB



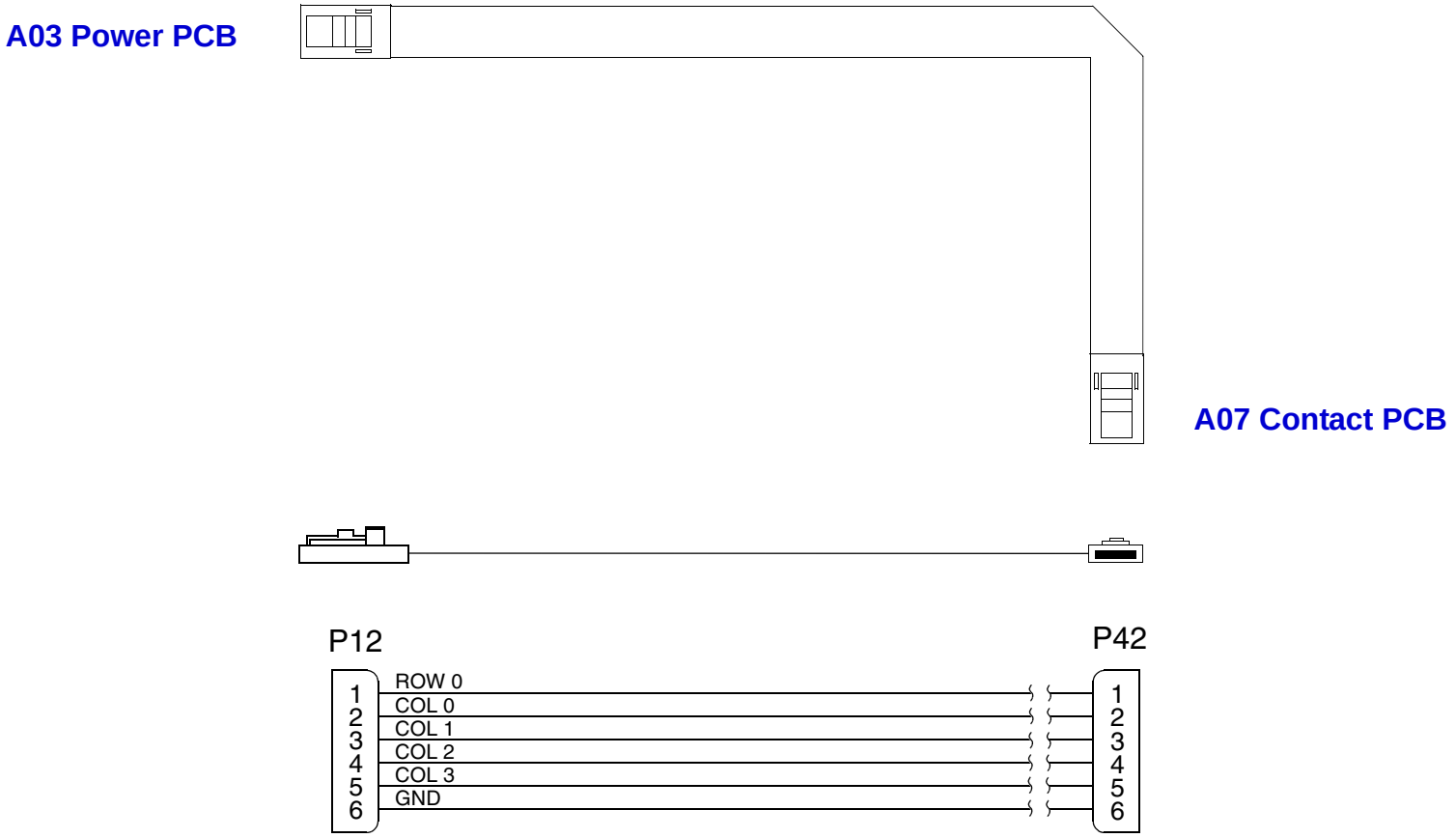
779

A05 Interface PCB

P2		P30
1	UC SERIAL OUT	1
2	UC SHIFT CLK	2
3	GND	3
4	UC LED CTRL	4
5	UC SHIFT CTRL	5
6	ENC1 IN	6
7	ENC0 IN	7
8	ENC ON	8
9	SERVICE*	9
10	GND	10
11	XREQ2	11
12	AUDIO PWR	12
13	AUDIO	13
14	GND	14
15	UC SERIAL IN	15
16	UC VCC	16
17	PWR SW*	17
18	CHG LED	18
19	PWR LED	19
20	SW VB	20
21	GND	21
22	LCD BL ON	22
23	LCD FRM	23
24	LCD LE	24
25	GND	25
26	LCD CLK	26
27	LCD ON	27
28	LCD VL	28
29	GND	29
30	LCD VEE	30
31	LCD DH<0>	31
32	LCD DH<1>	32
33	LCD DH<2>	33
34	GND	34
35		

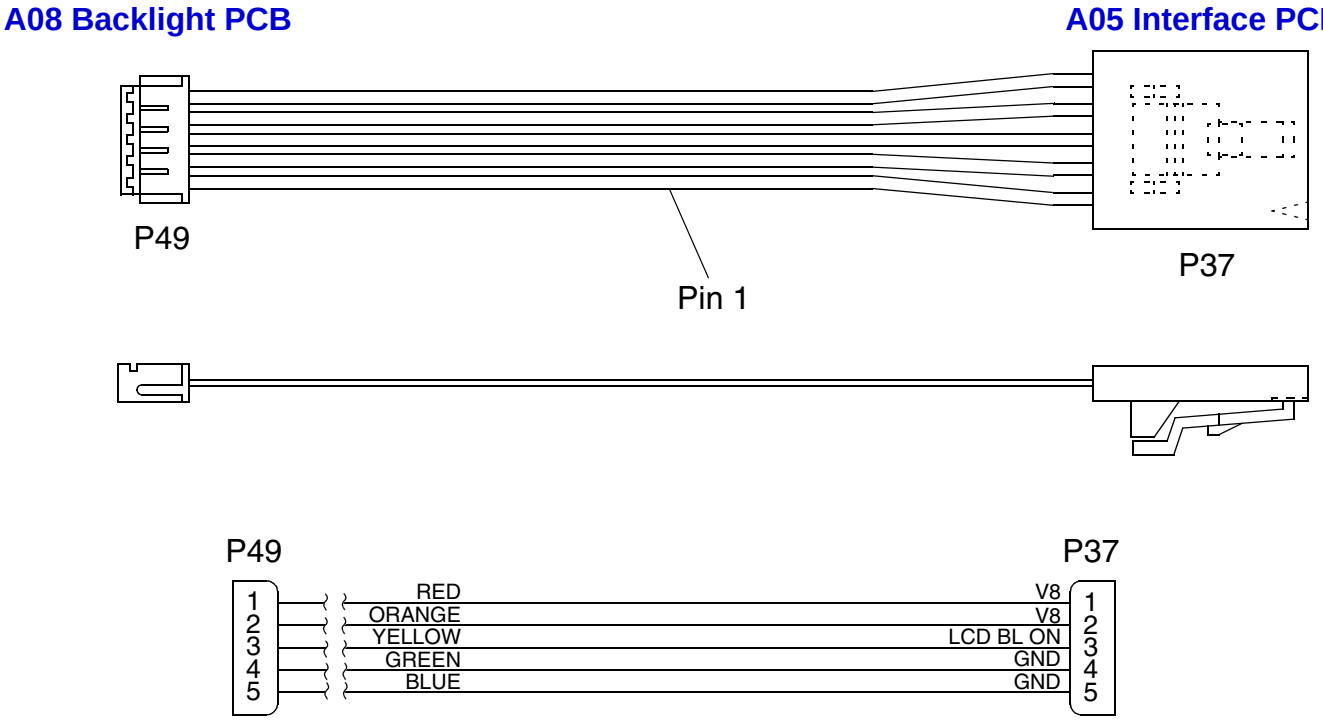
P2		P30
35	LCD DH<3>	35
36	LCD DL<0>	36
37	LCD DL<1>	37
38	GND	38
39	LCD DL<2>	39
40	LCD DL<3>	40
41	LCD VCC	41
42	GND	42
43	MOTOR-	43
44	MOTOR+	44
45	THERM2	45
46	GND	46
47	VDD	47
48	DATA	48
49	STB1*	49
50	STB2*	50
51	LATCH	51
52	CLK	52
53	GND	53
54	VHD	54
55	VHD	55
56	VHD	56
57	VHD	57
58	GND	58
59	VHD	59
60	VHD	60
61	VHD	61
62	VHD	62
63	GND	63
64	HEAD TYPE	64
65	EMITTER CATHODE	65
66	SENSOR COLLECTOR	66
67	EMITTER ANODE	67
68	GND	68

W05 Power PCB/Contact PCB Cable, MIN 3009678-05



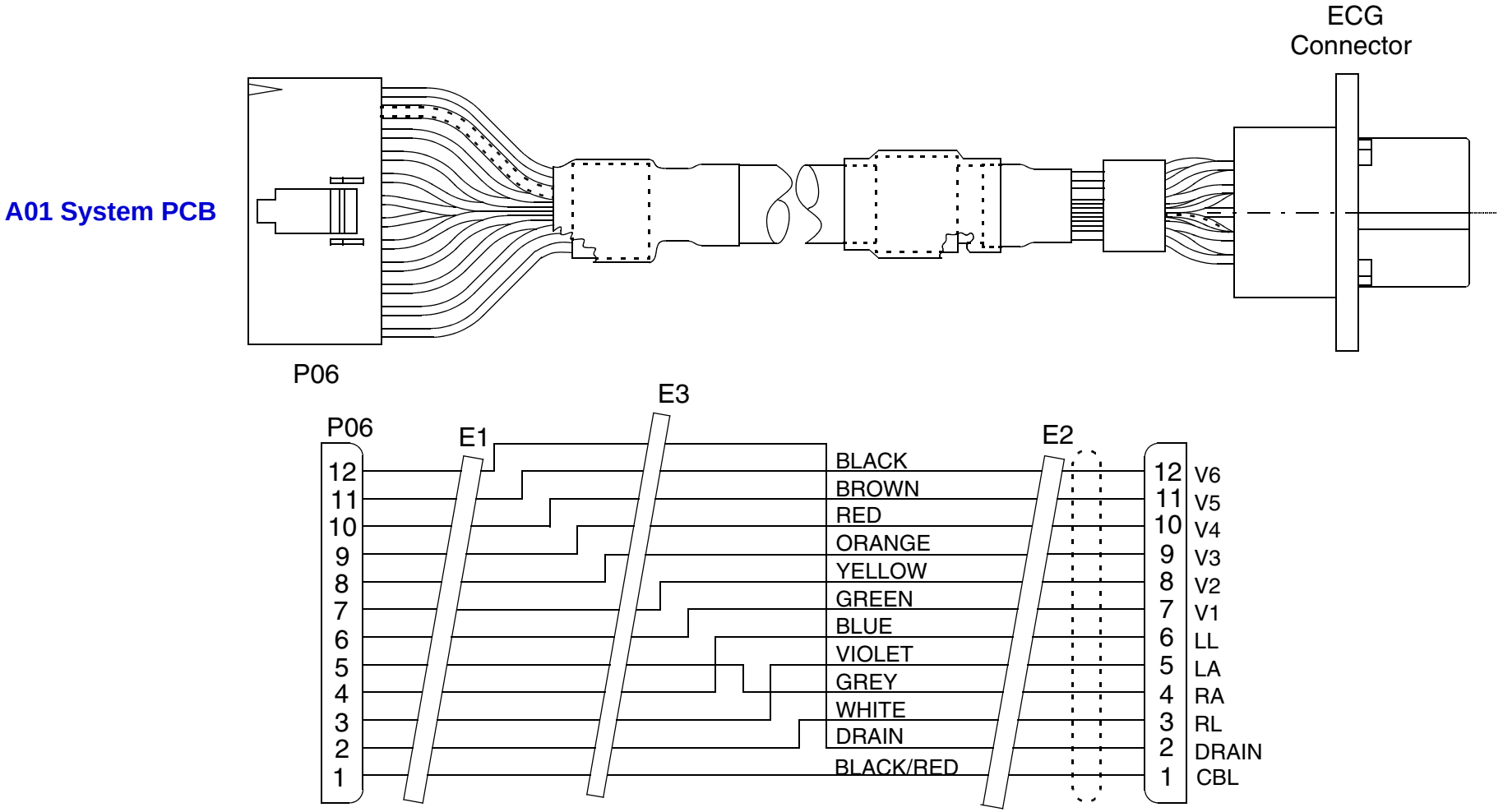
780

W06 Backlight PCB/Interface PCB LCD Cable, MIN 3009702-000 – LCD Devices



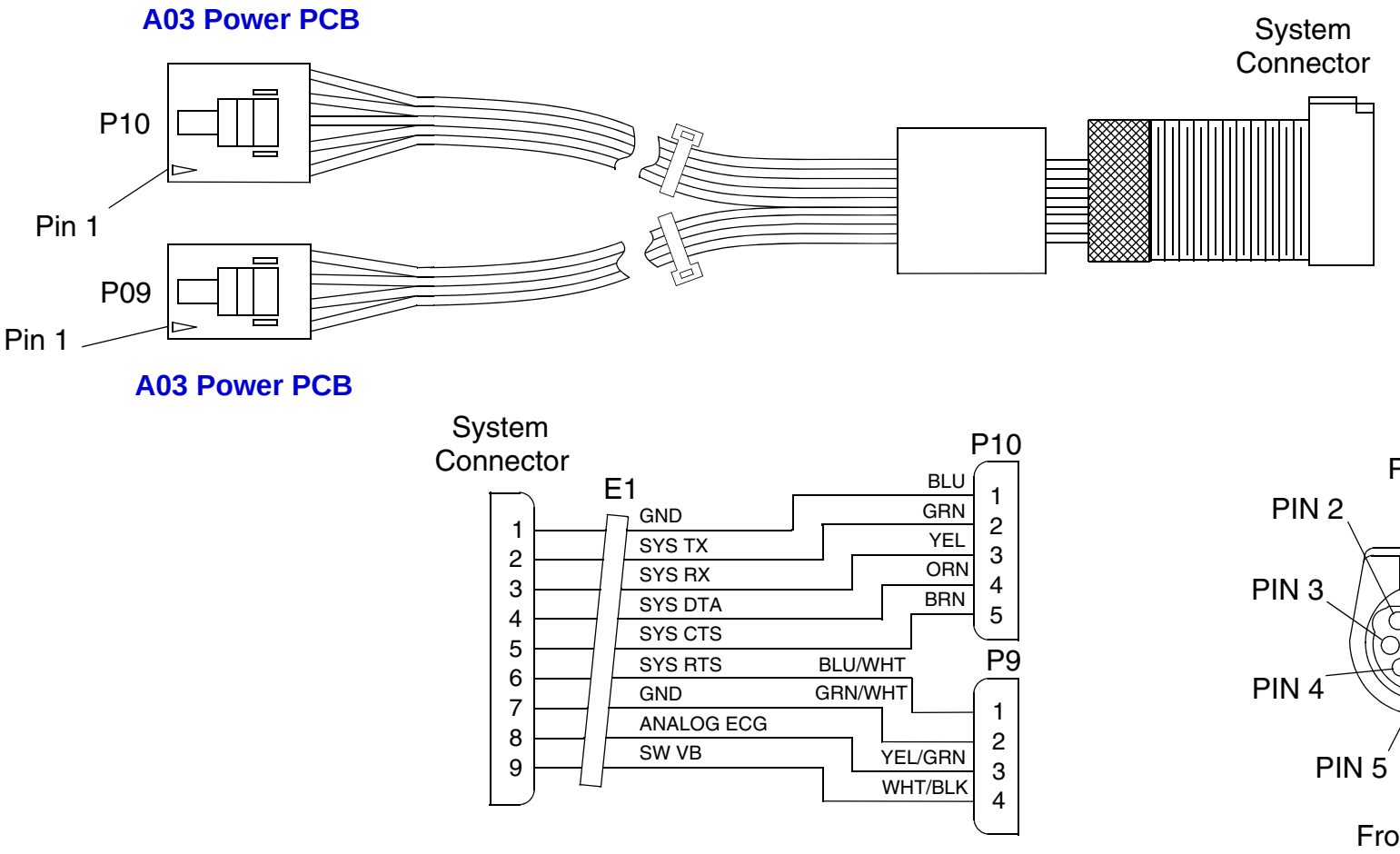
781

W07 ECG Connector Cable, MIN 3007991-003



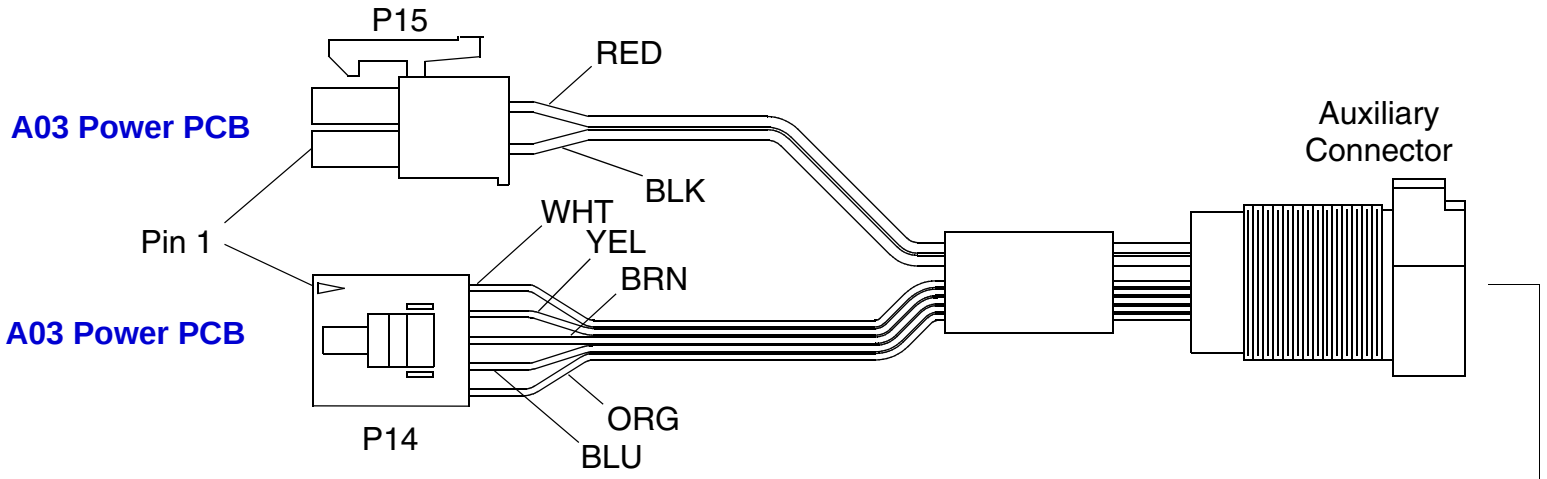
782

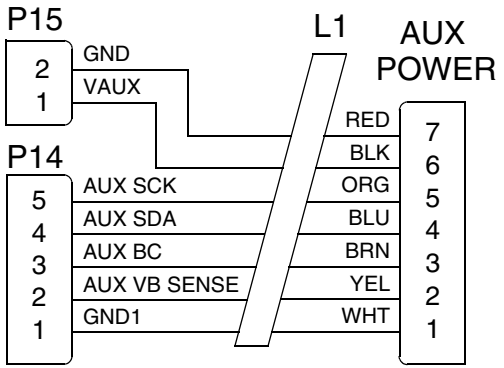
W08 System Connector Cable, MIN 3009652-01

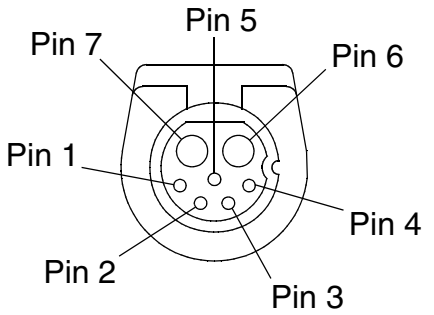


783

W09 Auxiliary Connector Cable, MIN 3008392-00



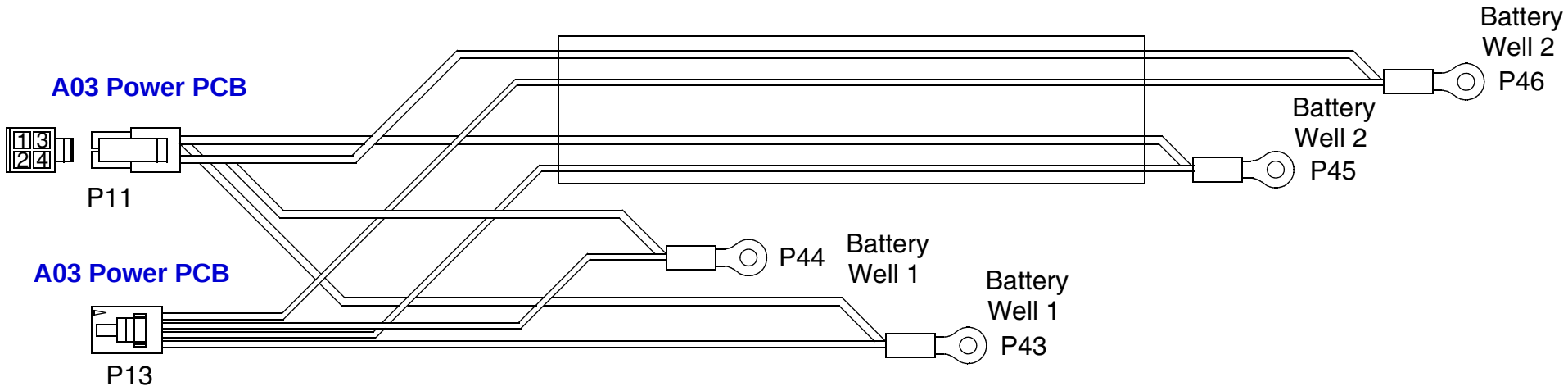


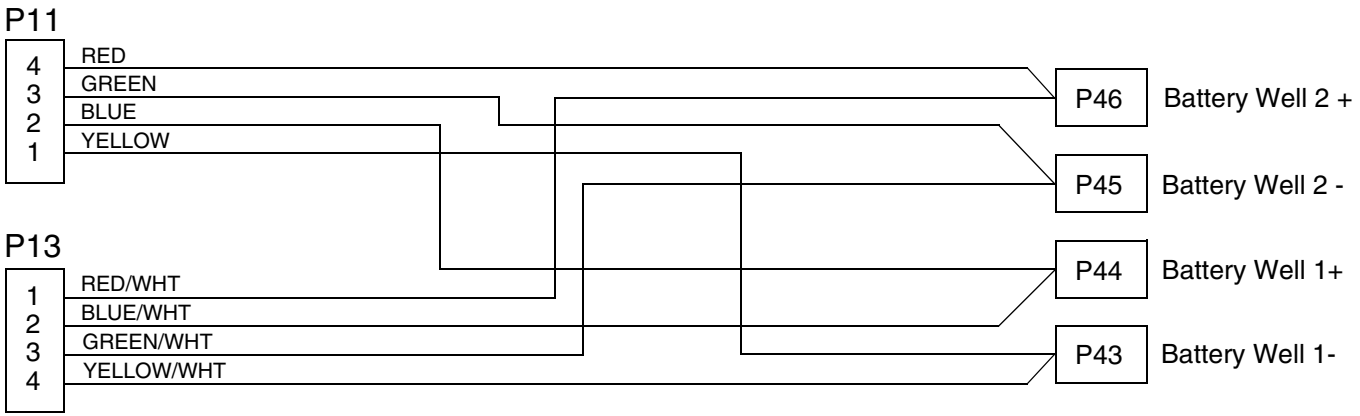


Front View

784

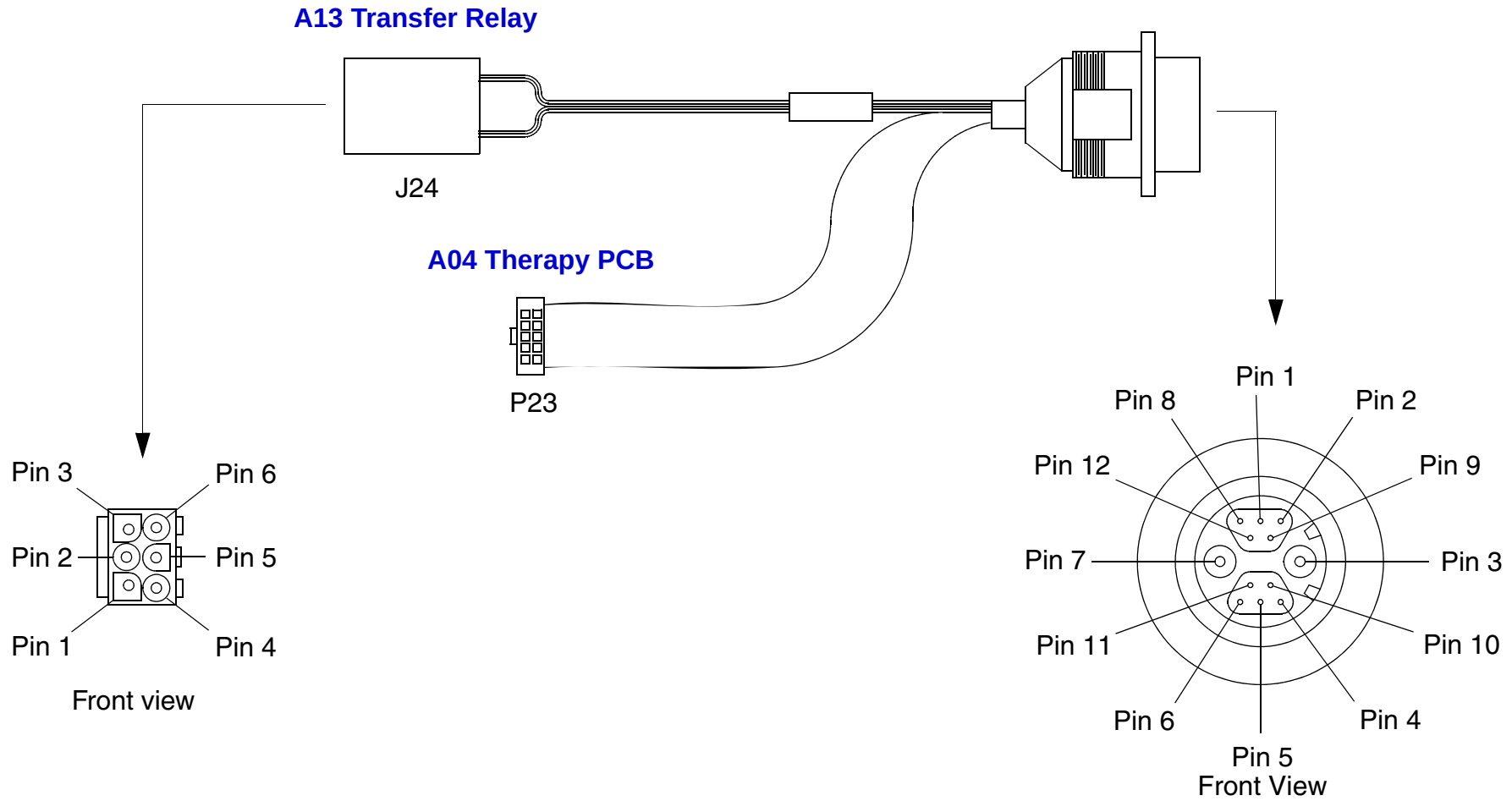
W10 Battery Pins/Power PCB Cable, MIN 3009726-08





785

W11 Therapy Connector Cable, MIN 3006216-004



786

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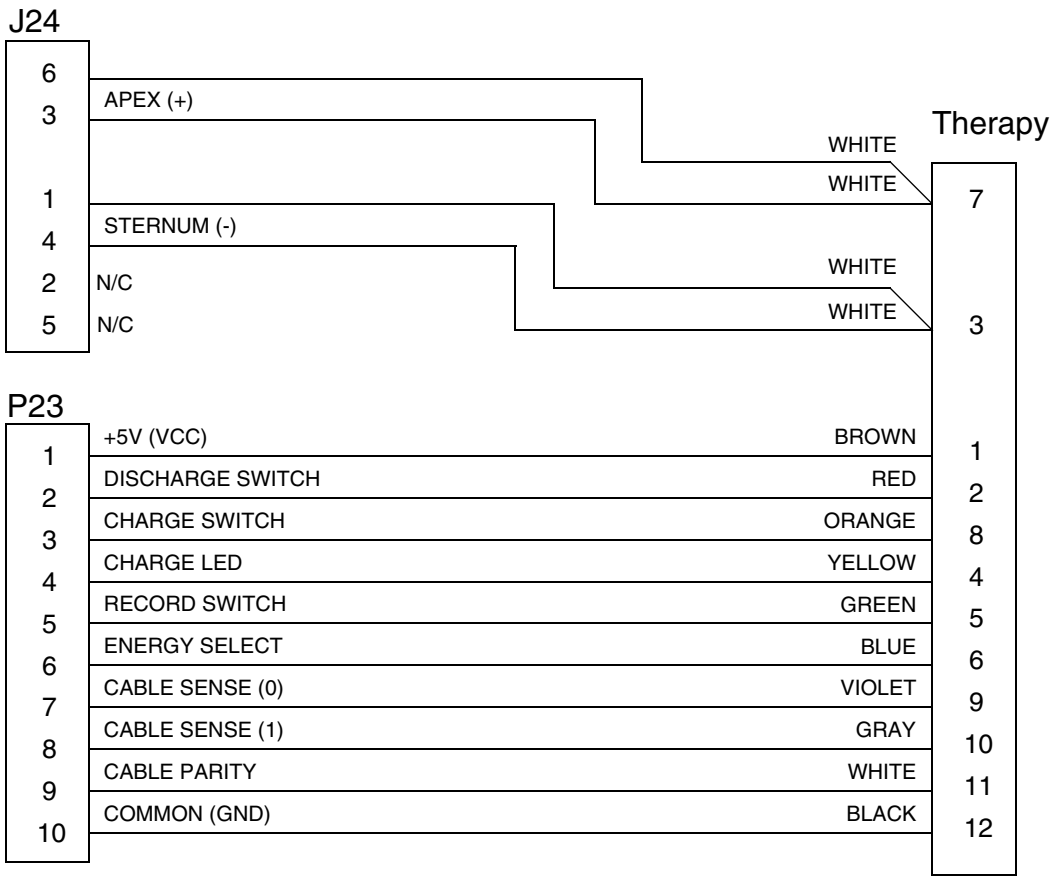
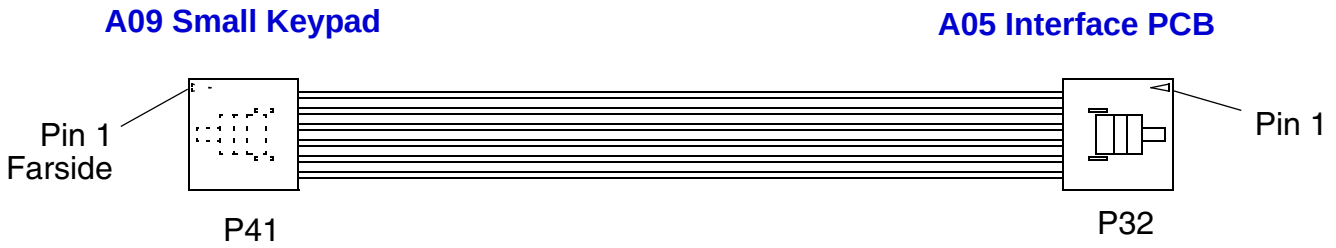
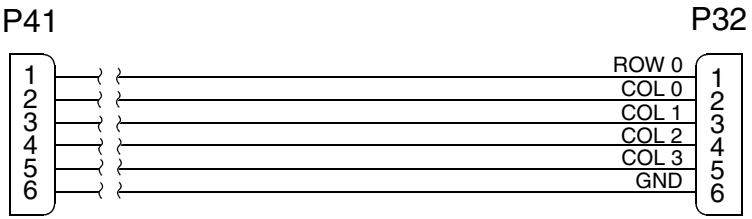
W11 Therapy Connector Cable *(continued)*



787

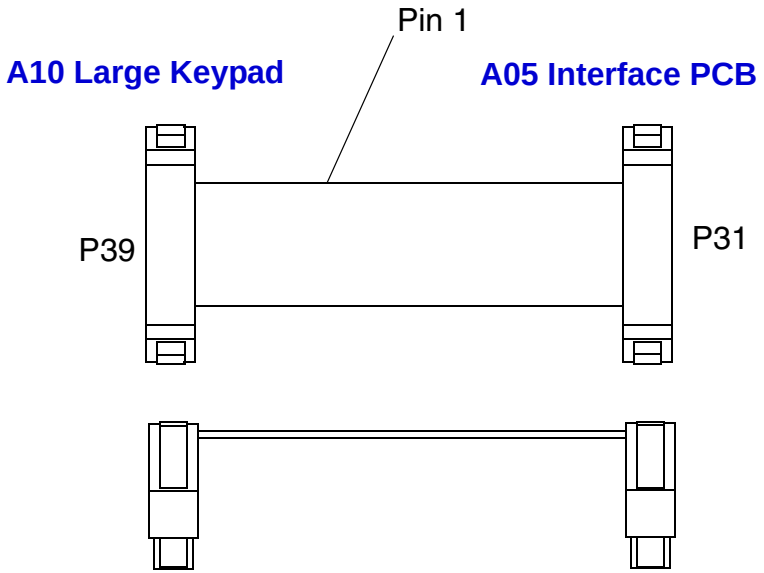
W12 Small Keypad/Interface PCB Cable, MIN 3009726-04

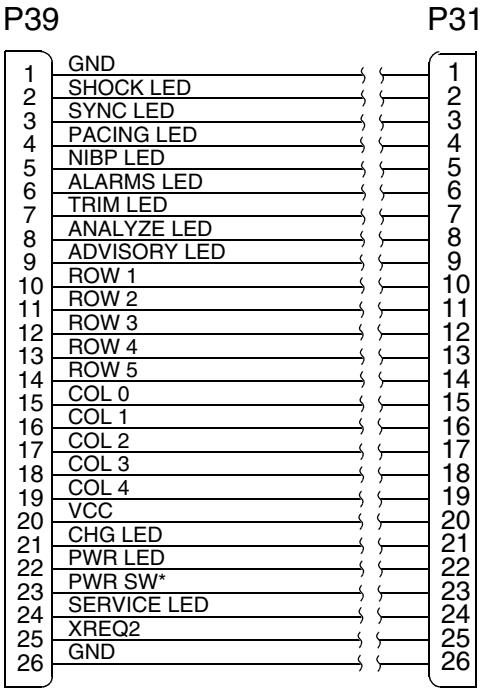




788

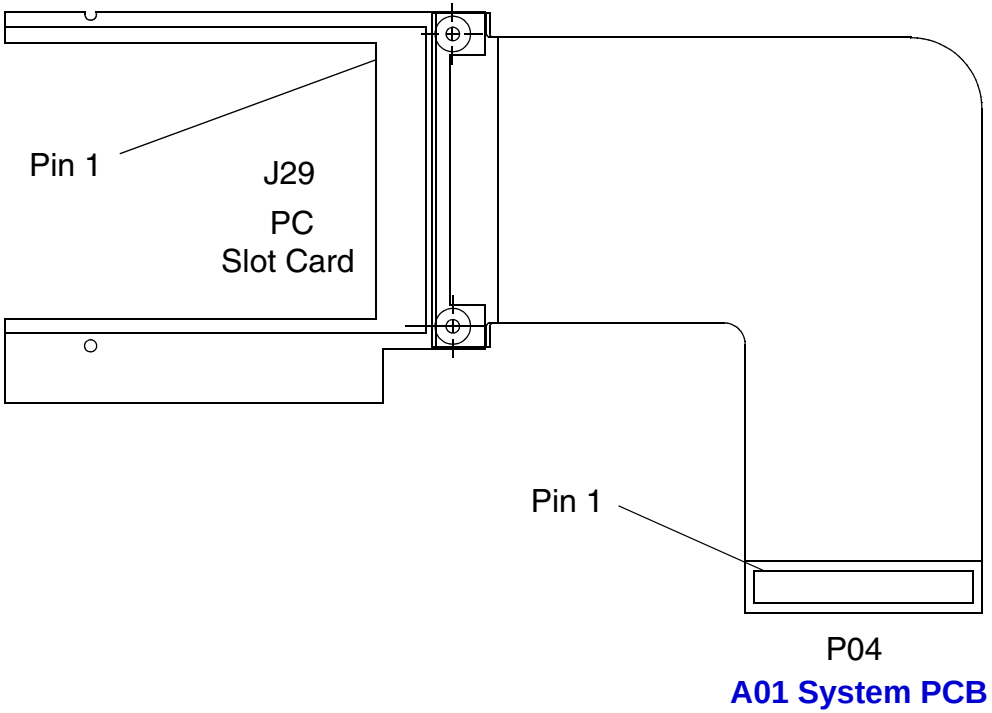
W13 Large Keypad/Interface PCB Cable, MIN 3009677-03





789

W14 System PCB/PC Card Slot Cable, MIN 3009276-02



790

(Continued on next page)

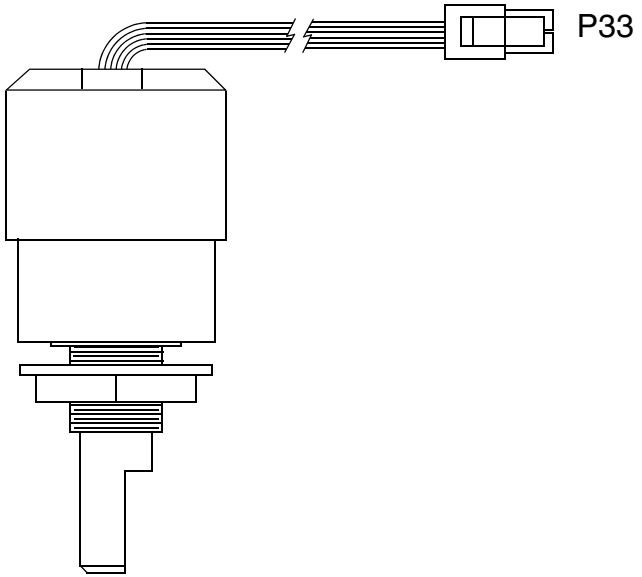
W14 System PCB/PC Card Slot Cable *(continued)*

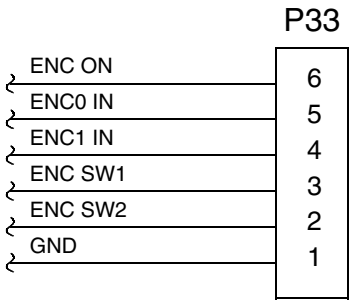
J29	TYPE	P04	J29	TYPE	P04
-	-	1	35	GND	36
1	GND	2	36	DET	37
2	SIG	3	37	SIG	38
3	SIG	4	38	SIG	39
4	SIG	5	39	SIG	40
5	SIG	6	40	SIG	41
6	SIG	7	41	SIG	42
7	SIG	8	42	SIG	43
8	SIG	9	43	SIG	44
9	SIG	10	44	SIG	45
10	SIG	11	45	SIG	46
11	SIG	12	46	SIG	47
12	SIG	13	47	SIG	48
13	SIG	14	48	SIG	49
14	SIG	15	49	SIG	50
15	SIG	16	50	SIG	51
16	SIG	17	51	SIG	52
17	SIG	18	52	SIG	53
18	SIG	19	53	SIG	54
19	SIG	20	54	SIG	55
20	SIG	21	55	SIG	56
21	SIG	22	56	SIG	57
22	SIG	23	57	SIG	58
23	SIG	24	58	SIG	59
24	SIG	25	59	SIG	60
25	SIG	26	60	SIG	61
26	SIG	27	61	SIG	62
27	SIG	28	62	SIG	63
28	SIG	29	63	SIG	64
29	SIG	30	64	SIG	65
30	SIG	31	65	SIG	66
31	SIG	32	66	SIG	67
32	SIG	33	67	DET	68
33	SIG	34	68	GND	69
34	GND	35	-	-	-

791

W15 Selector Assembly, MIN 3011128-002

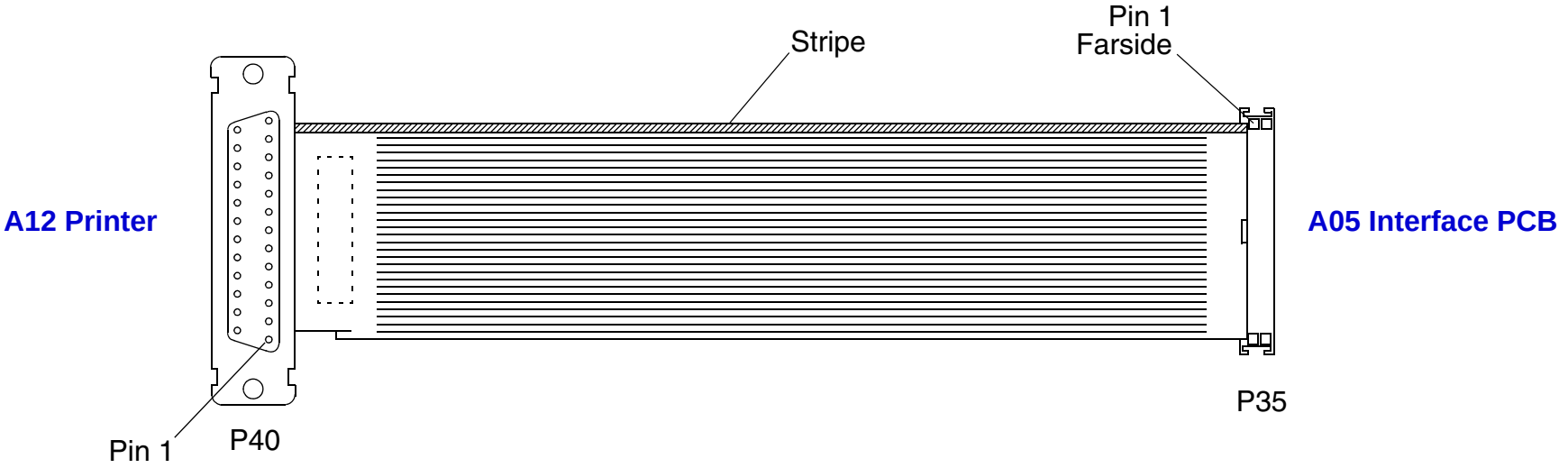
A05 Interface PCB





792

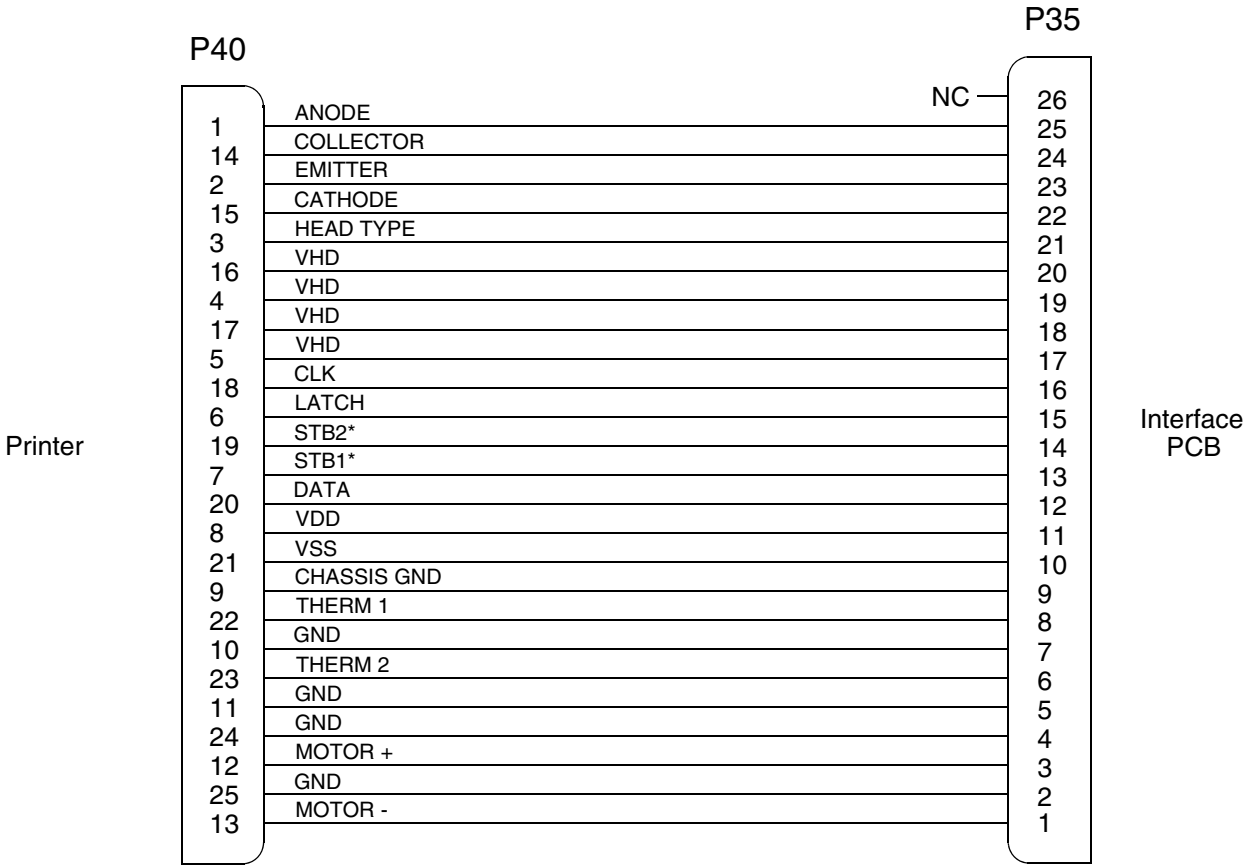
W16 Printer Assembly/Interface PCB Cable, MIN 3009724-00



793

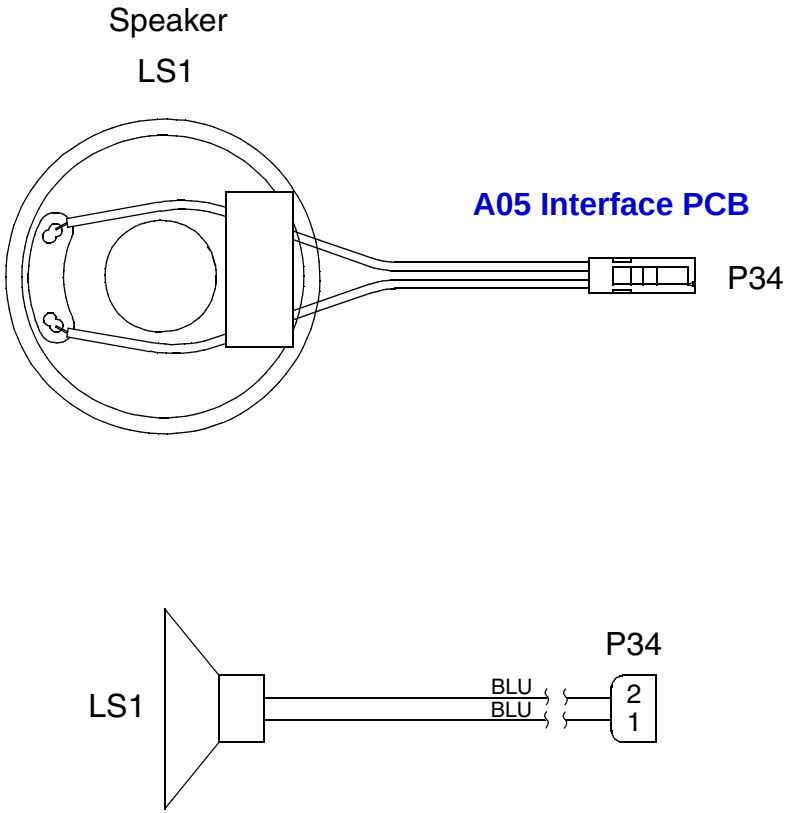
(Continued on next page)

W16 Printer Assembly/Interface PCB Cable *(continued)*



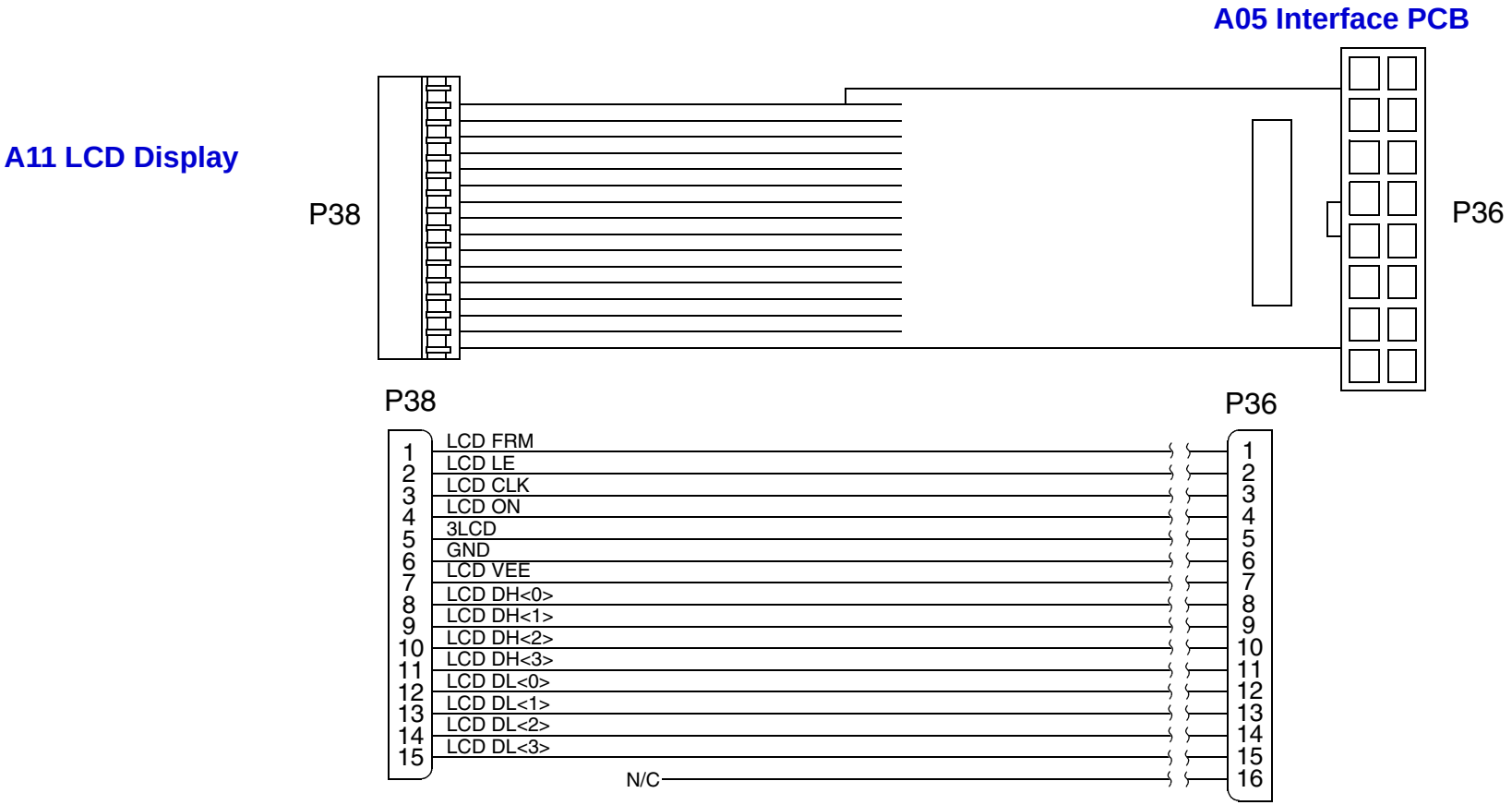
794

W17 Speaker Assembly, MIN 3009726-03



795

W18 LCD Assembly/Interface PCB Cable, MIN 3009701-000 – LCD Only

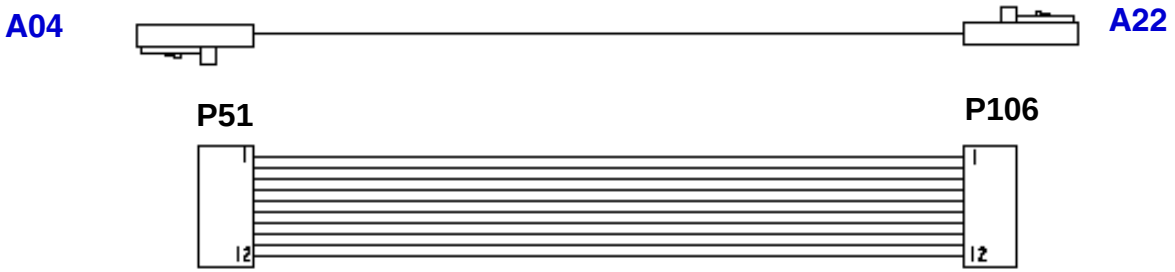


796

W19 Printer Assembly/Chassis Ground Cable, MIN 3009726-01

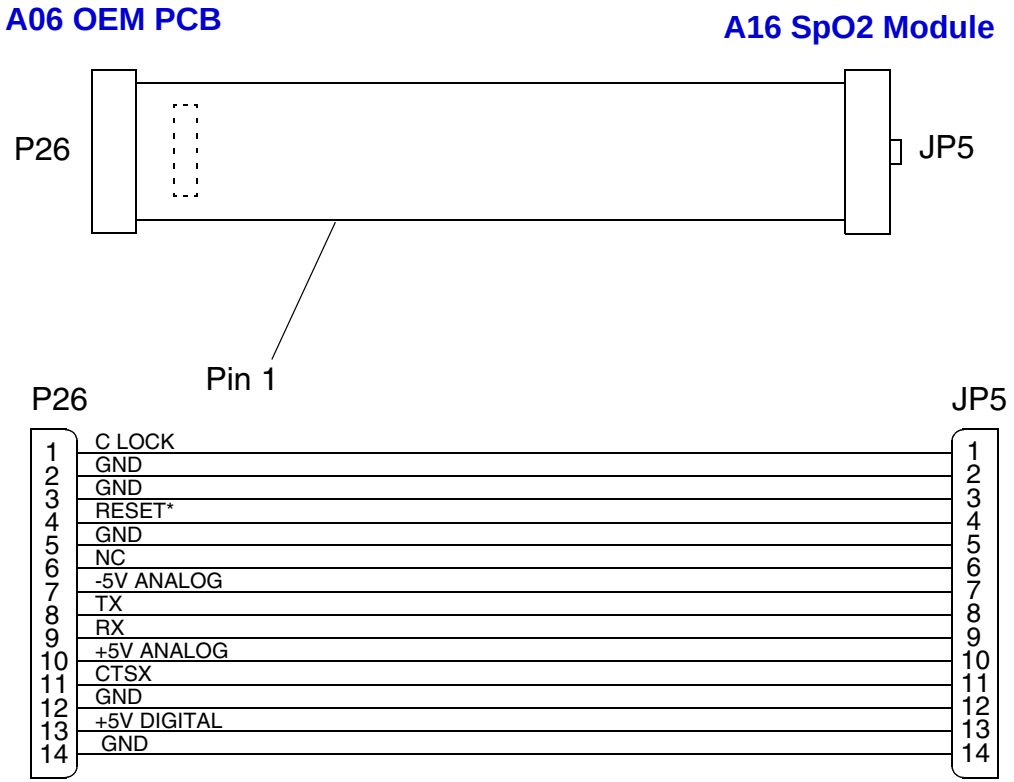
797

W20 Biphasic to Therapy PCB Flex Cable, MIN 3011792-003



798

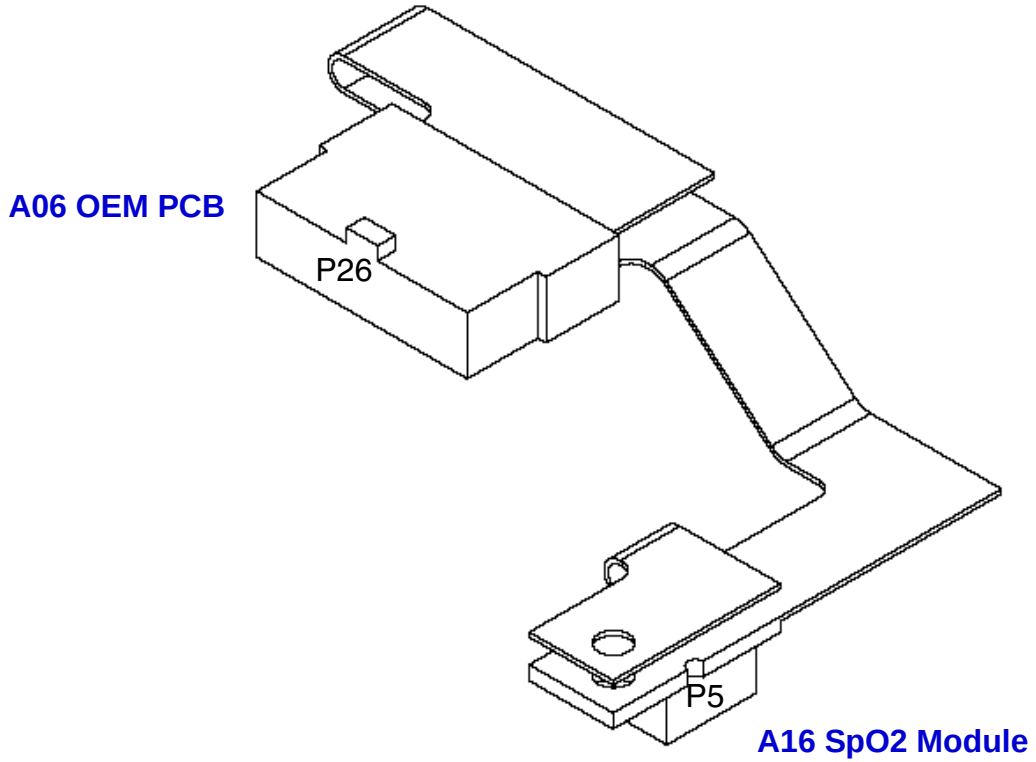
W21 OEM PCB/SpO2 Module Cable – Nellcor, MIN 3009700-00



799

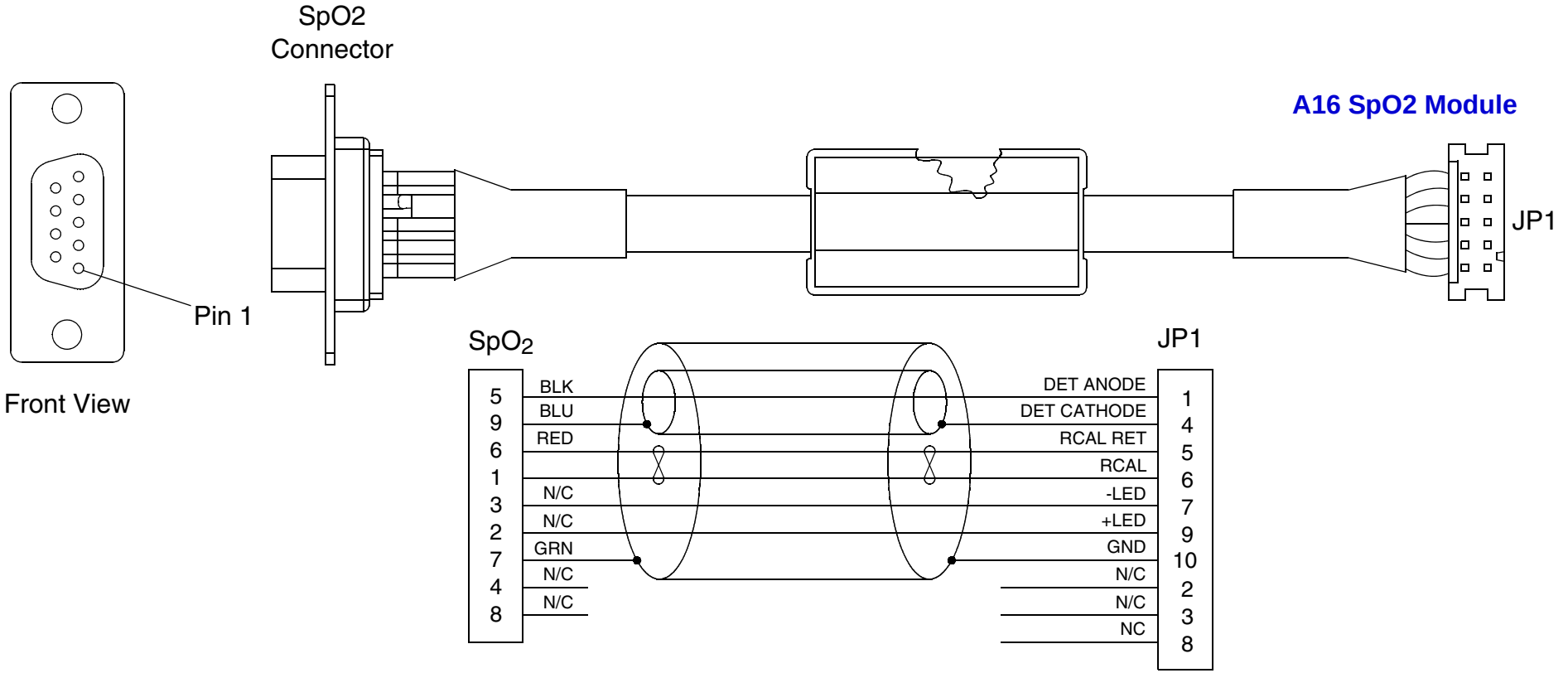
(Continued on next page)

W21 OEM PCB/SpO2 Module Cable – Masimo, MIN 3203607-000



800

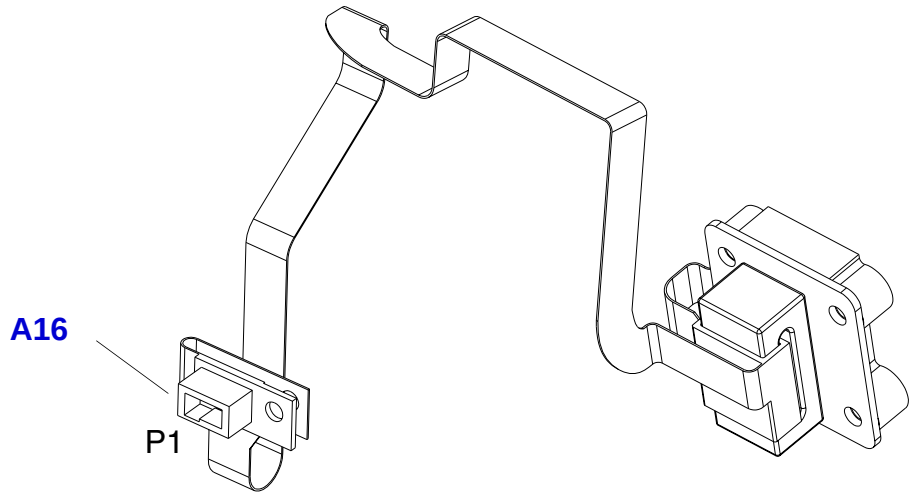
W22 SpO2 Connector Cable – Nellcor, MIN 3007993-003



801

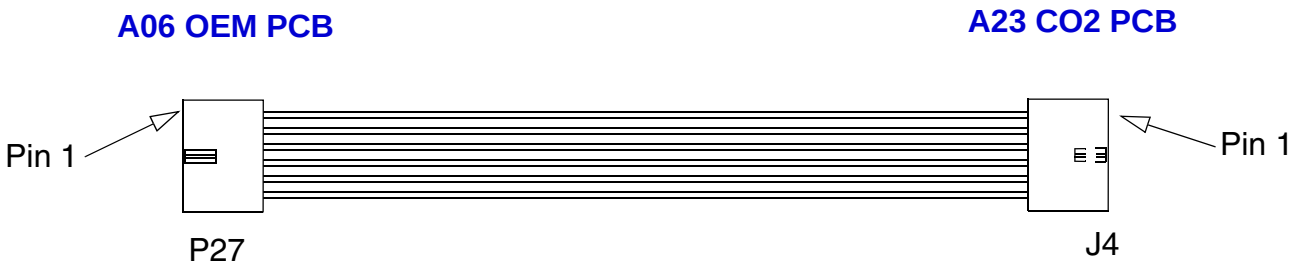
(Continued on next page)

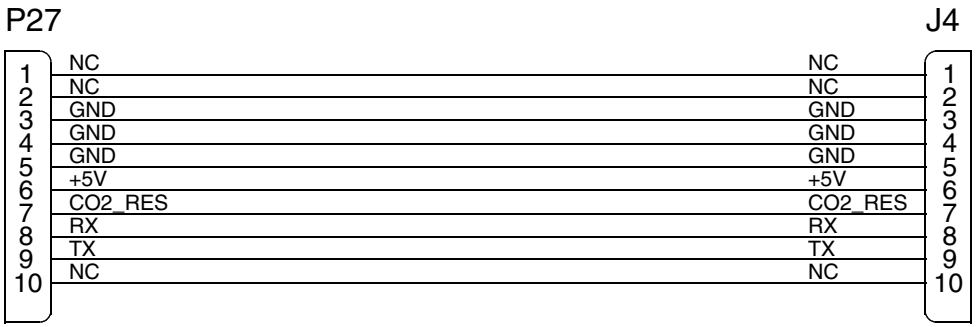
W22 SpO2 Connector Cable – Masimo, MIN 3203369-000



802

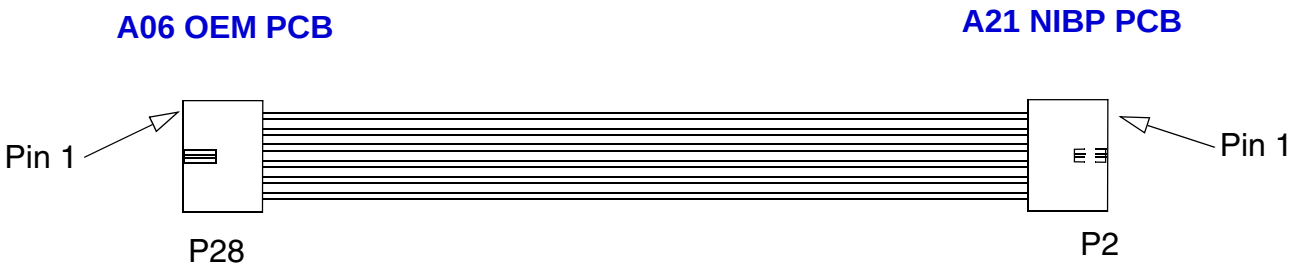
W26 OEM PCB/CO2 PCB Cable, MIN 3012181-02

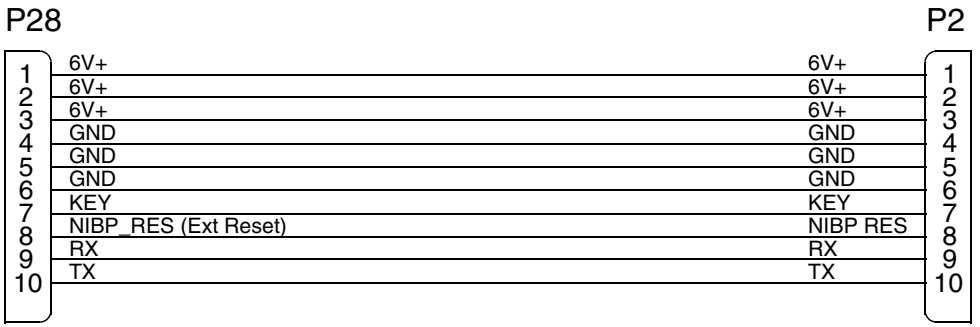




803

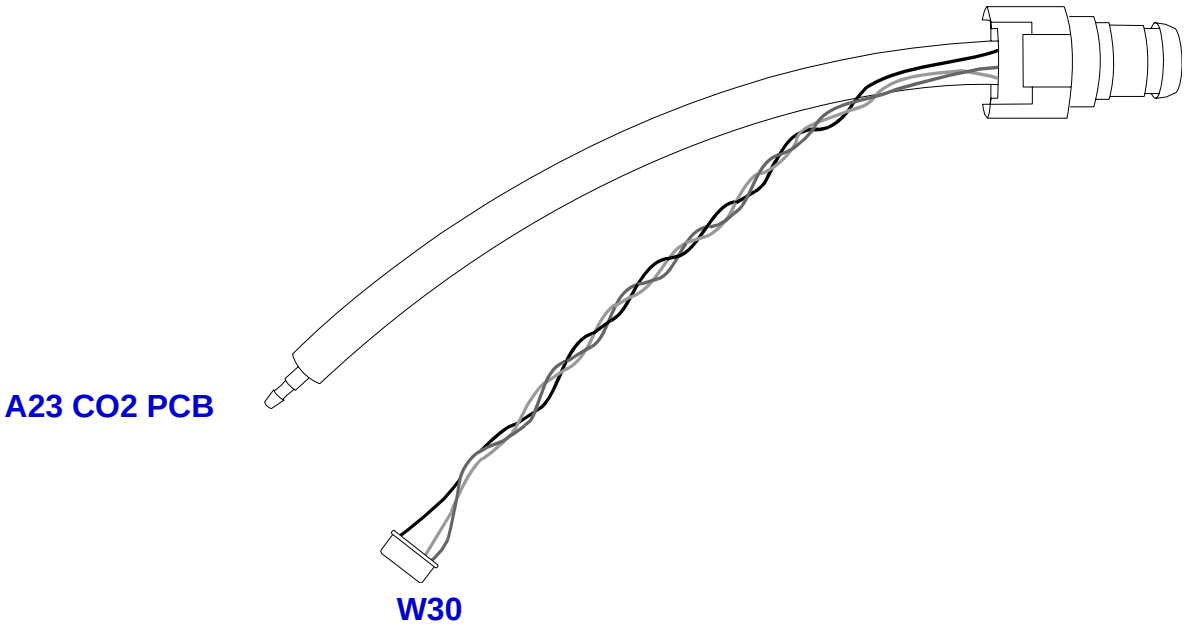
W27 OEM PCB/NIBP PCB Cable, MIN 3012181-00





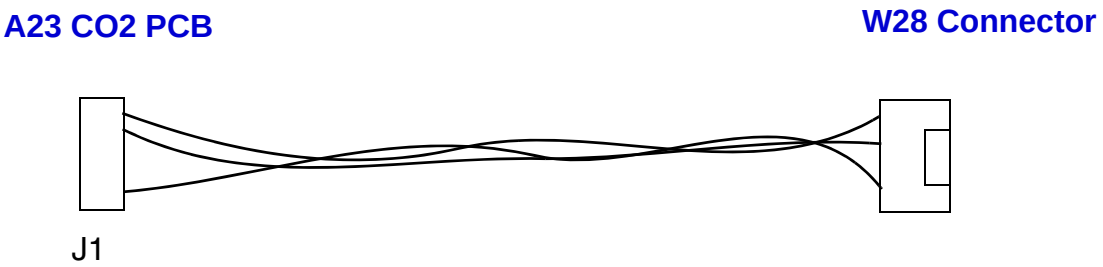
804

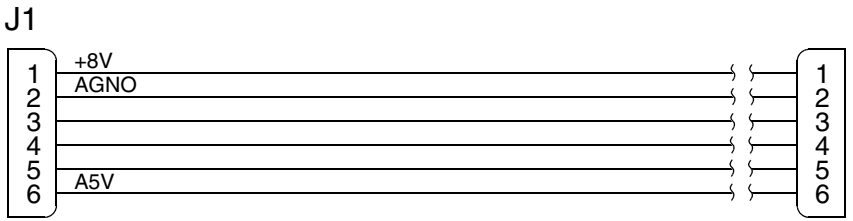
W28 CO2 Connector, MIN 3012140-001



805

W30 CO2 PCB Adapter Cable, MIN 3012397-01

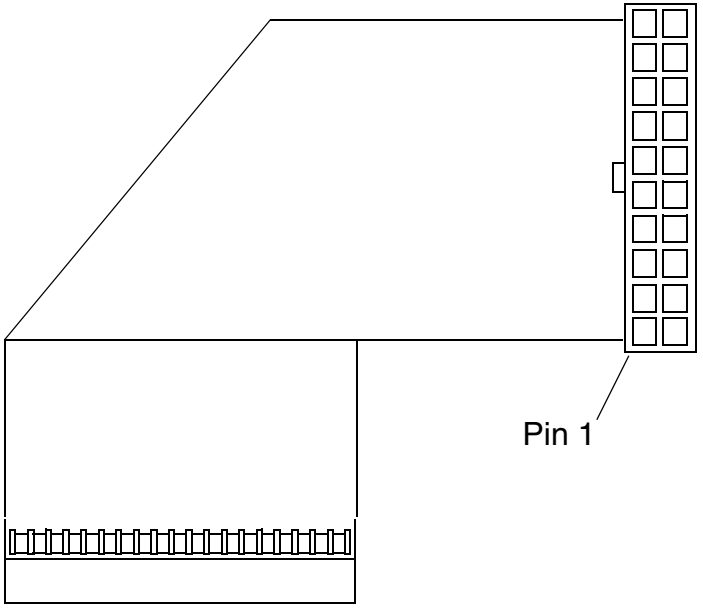




806

W32 EL Assembly/Interface PCB Cable, MIN 3012736-00

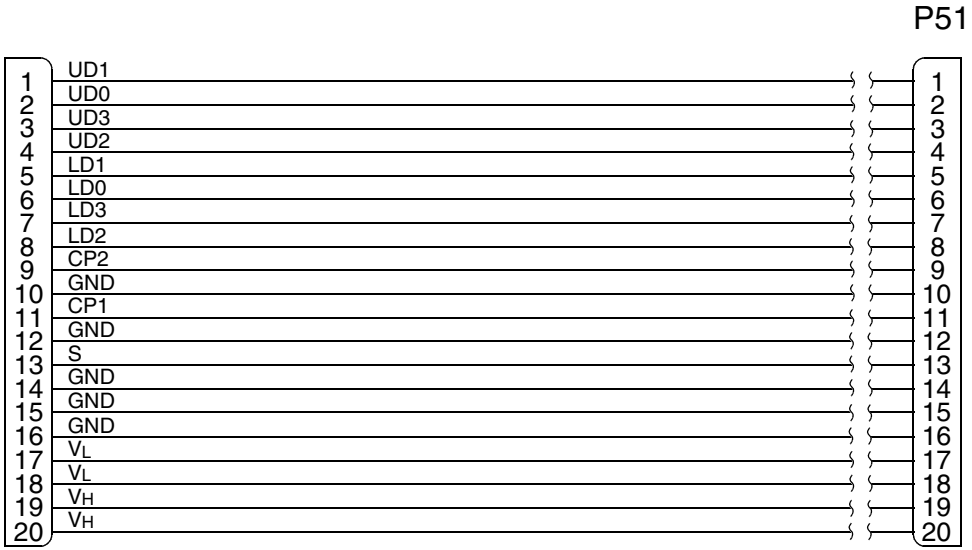
(EL Only—Part of A11)



A11 EL Display

A05 Interface PCB

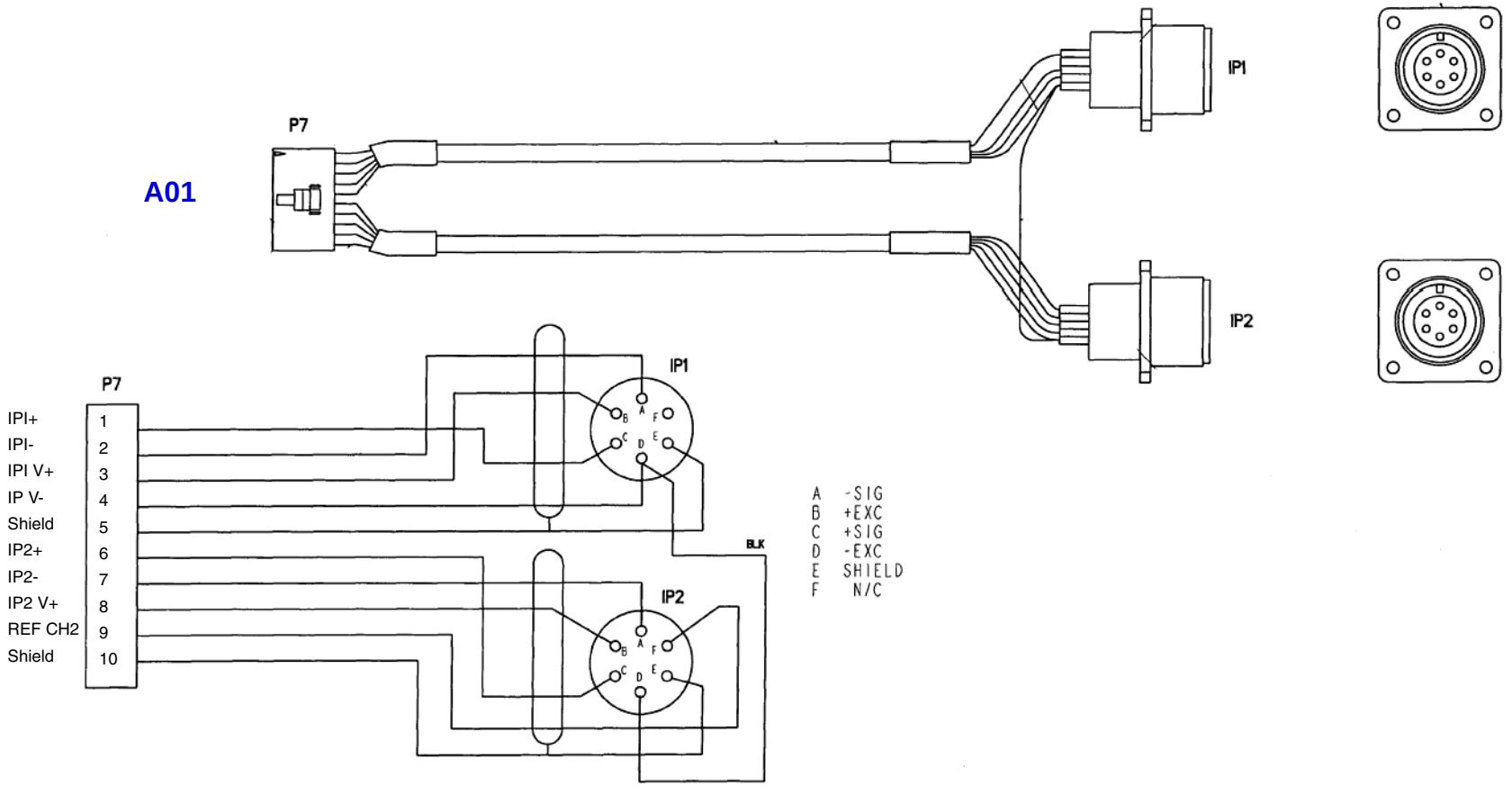
P51



807

W33 Invasive Pressure Assembly, MIN 3200466-001

A01



808

Service Replacement Kits

The Service Replacement kits include components that support a particular replacement activity.

Due to the need for special tooling and processes, the Front and Rear Case Replacement Kits come partially assembled from the factory.

MIN	Part Description	Note	CAT.
3011608-00	Front Case Service Replacement Kit—LCD Devices		40998-000117
3011608-01	Rear Case Service Replacement Kit		40998-000118
3011608-04	A08 Backlight PCB Service Replacement Kit		40998-000123
3011608-05	External Hardware Service Replacement Kit		40998-000124
3011608-06	Internal Hardware Service Replacement Kit		40998-000125
3011608-07	System/Therapy PCB Hardware Service Replacement Kit		40998-000126
3011608-08	Paddle Retainer Service Replacement Kit		40998-000127
3011608-10	EtCO2 Door Kit		40998-000129
3011608-013	Top Case Service Replacement Kit, Battery Support System 2		40998-000119

(Continued on next page)

Service Replacement Kits *(continued)*

MIN	Part Description	Note	CAT.
3011608-021	W07 ECG Connector Cable Service Replacement Kit		40998-000122
3011608-022	Therapy Connector Service Replacement Kit		40998-000120
3011608-023	W22 SpO2 Connector Cable Service Replacement Kit		40998-000121
3011608-024	Foam Service Replacement Kit		40998-000131
3011608-025	Front Case Service Replacement Kit—EL Display Devices		40998-000220
3011608-026	Masimo SpO2 Connector Service Replacement Kit		40998-000221
3011608-027	Therapy PCB Service Replacement Kit (Biphasic only)		40998-000222
3011608-034	Therapy PCB Service Replacement Kit (Monophasic only)		Unavailable att
3200493-00	Interconnect Cable Replacement Kit (for AC or DC Power Adapters)		21330-000246

Front Case Kit — LCD Devices, MIN 3011608-00

The following is a list of the items in this Replacement kit.

Item	Qty	MIN	Part Description	Note
2	1	3006113-05	Front Case	Front Case
190	1	3006245-00	W17 Speaker Assembly Felt	Front Case
172	1	3009065-01	Medtronic Icon Label	Front Case
212	1	3006186-04	A11 LCD Assembly Lens	Front Case
242	1	804234-03	Case Perimeter Seal	Front Case

Rear Case Kit, MIN 3011608-01

The following is a list of the items in this Replacement kit.

Item	Qty	MIN	Part Description	Note
4	1	3006114-006	Rear Case	Rear Case
16	1	3006291-00	Drain Seal	Rear Case
28	2	3006766-02	Paddle Cover Latch Assembly	Rear Case
150	1	3010591-04	Rear Case EMI Shield	Rear Case
156	1	804194-00	A15 Energy Storage Capacitor Mount Cover	Rear Case
166	1	3009060-001	FDA Label	Rear Case
168	1	3009061-00	W09 Auxiliary Connector Cable Label	Rear Case
174	1	3009789-002	Left Latch Cover Label	Rear Case
176	1	3009789-003	Right Latch Cover Label	Rear Case
186	4	802278-02	Battery Pin	Rear Case
192	1	804447-20	Spacer, Foam, 3.0 W × 2.0 H × 0.1 T	Rear Case
202	4	802885-00	Mounting Foot	Rear Case

(Continued on next page)

Rear Case Kit, MIN 3011608-01 *(continued)*

Item	Qty	MIN	Part Description	Note
208	4	804206-01	Battery Grommet	Rear Case
216	4	201508-000	Carbon Steel Lock Nut, 4-40 Thread	Rear Case
266	1	3203396-000	Sponge, with Adhesive	Rear Case
303	1	804447-33	Adhesive Part, 1.0 W × 3.0 H × .125 T	Rear Case (Monophasic Only)
W10	1	3009726-08	Battery Pins/A03 Power PCB Cable	Rear Case
24	1	3006375-02	Battery Retainer	Rear Case
340	1	3012209-00	CO2 Exhaust Seal	Rear Case
342	1	3012178-00	CO2 Exhaust Cover Label, with CO2	Rear Case
342	1	3012178-01	CO2 Exhaust Cover Label, without CO2	Rear Case
224	1	200536-011	Cable Tie, Nylon, 21Inch	Rear Case
232	14	201407-069	Nylock Screw, 6-32 x .375 L	
288	1	3011526-00	Oximeter Patent Label (Nellcor)	SpO2 Assembly (Battery Well 1)
288	1	3011526-001	Masimo Patent Label	SpO2 Assembly (Battery Well 1)
302	1	804447-33	Spacer, Foam, Inductor	Rear Case (Monophasic Only)
	0	3009057-008	Serial Number Label	Order S/N Label from Medtronic

W22 SpO2 Connector Cable Kit, MIN 3011608-023

The following is a list of the items in this Replacement kit.

Item	Qty	MIN	Part Description	Note
206	1	3007996-01	Gasket, W22 SpO2 Connector Cable	Nellcor SpO2 Option
W22	1	3007993-003	SpO2 Connector Cable	Nellcor SpO2 Option

W07 ECG Connector Cable Kit, MIN 3011608-021

The following is a list of the items in this Replacement kit.

Item	Qty	MIN	Part Description	Note
236	1	805915-01	Seal, W07 ECG Receptacle	
W07	1	3007991-02	ECG Connector Cable	

A08 Backlight PCB Kit, MIN 3011608-04

The following is a list of the items in this Replacement kit.

Item	Qty	MIN	Part Description	Note
A08	1	3006806-00	PCB Assy, Backlight Inverter, LCD	Front Case
182	2	3009483-01	Adhesive, A11 LCD Assembly	Front Case
264	2	805613-00	Adhesive, ESD Shield	Front Case
280	2	201501-017	Foam Tape .75 W × .045 T	Front Case

(Continued on next page)

External Hardware Kit, MIN 3011608-05

The following is a list of the items in this Replacement kit.

Item	Quantity	MIN	Part Description	Note
36	1	3009412-00	Plug, Front Panel	Front Case
178	1	3009790-00	Label, 50 mm Printer Screw Cover	Front Case
232	24	201407-069	Nylock Screw, 6-32 × .375 L	Rear Case

Internal Hardware Kit, MIN 3011608-06

The following is a list of the items in this Replacement kit.

Item	Qty	MIN	Part Description	Note
188	1	201457-001	Adhesive Cable Tie Mount	Front Case
204	1	3006809-00	Printer Connector Gasket	Front Case
216	14	201508-000	Carbon Steel Lock Nut, 4-40 Thread	A01/A02/A04 Assembly
222	9	200536-001	Self-locking Cable Tie .10 W × 4.0 L	Front/Rear Case
224	1	200536-011	Self-locking Cable Tie .35 W × 21.0 L	Rear Case
226	3	3010805-000	10-Pin Socket Retainer Clip	SpO2 Option
228	2	3010805-001	14-Pin Socket Retainer Clip	SpO2 Option
230	45	202253-761	Nylock Screw, 4-40 × .312 L	Front/Rear Case
234	6	202253-729	Nylock Screw, 2-56 × .312 L	Rear Case/SpO2 Option
240	2	200060-011	System and Aux Connector O-ring Seals	Rear Case
246	1	3012693-00	Spring Clamp, W17 Speaker Assembly	Front Case
248	1	3010569-02	Nylon Hex Standoff	Rear Case
251	9	200266-006	Hex Standoff, 4-40 × .250 W × .375 L	A01/A02/A04 Assembly

(Continued on next page)

Internal Hardware Kit, MIN 3011608-06 *(continued)*

Item	Qty	MIN	Part Description	Note
292	2	3011630-00	Spacer, PCB	
294	1	3011629-00	Hex Insert	
296	1	202253-550	Nylock Screw, 4-40 × 1.125 L	
336	6	200804-102	Washer, Flat, .312 OD × .125 ID	
376	6	202253-730	Nylock Screw, 2-56 × .375 L	
378	1	3012180-02	NIBP Tubing	

System/Therapy PCB Hardware Kit, MIN 3011608-07

The following is a list of the items in this Replacement kit.

Item	Qty	MIN	Part Description	Note
36	1	3009412-00	Plug , Front Panel	
230	18	202253-761	Nylock Screw 4-40 × .312 L	
232	18	201407-069	Nylock Screw 6-32 od × .375 L	
296	1	202253-550	Nylock Screw 4-40 × 1.125 L	
336	2	200804-102	Flat Washer, .312 OD × .125 ID	

Paddle Retainer Kit, MIN 3011608-08

The following is a list of the items in this Replacement kit.

Item	Qty	MIN	Part Description	Note
174	1	3009789-002	Label, Left Latch Cover	
176	1	3009789-003	Label, Right Latch Cover	
28	2	3006766-02	Cover, Latch, Paddle	
232	6	201407-069	Nylock Screw 6-32 × .375 L	

Therapy Connector Kit, MIN 3011608-022

The following is a list of the items in this Replacement kit.

Item	Qty	MIN	Part Description	Note
W11	1	3006216-004	Therapy Connector Assembly	
218	1	200040-001	Therapy Connector Cable Snap Ring (C-Clip)	Used on Therapy Connector Assembly 3006216-03
238	1	3203445-000	Seal, Therapy Connector	

EtCO2 Door Kit, MIN 3011608-10

The following is a list of the items in this Replacement kit.

Item	Qty	MIN	Part Description	Note
	1	3201213-00	CO2 Door Replacement Tool	
356	1	3012120-03	CO2 Connector Cover	
354	1	3012119-02	CO2 Connector Adapter	
376	4	202253-730	Nylock Screw, 2-56 × .375 L	
196	1	804447-21	Foam Spacer	
360		3007997-01	Seal, Connector	

Front Case Kit — EL Devices, MIN 3011608-025

The following is a list of the items in this Replacement kit.

Item	Qty	MIN	Part Description	Note
2	1	3006113-06	Front Case	Front Case
190	1	3006245-00	Felt, W17 Speaker Assembly	Front Case
172	1	3009065-01	Label, Medtronic Icon	Front Case
212	1	3006186-008	Lens, A610 Color, 980 Hardcoat	Front Case
242	1	804234-03	Seal, Case Perimeter	Front Case
178	1	3009790-00	Label, Screw Cover	50mm Printer Filler

Foam Replacement Kit, MIN 3011608-024

The following is a list of the items in this Replacement kit.

Item	Qty	MIN	Part Description	Note
20	1	3012122-03	Lower Support Foam	
22	1	3012123-03	Upper Support Foam	
384	1	3012421-01	OEM PCB Shield	
228	1	3010805-001	14-pin Retainer Clip	
46	1	3006379-003	Relay Bracket	

Top Case Kit, MIN 3011608-013

The following is a list of the items in this Replacement kit. Refer to Battery Support System 2 Serial Manual for the assembly drawings.

Item	Qty	MIN	Part Description	Note
6	1	3010037-002	Top Case	
8	1	3009065-01	Medtronic Icon Label	
12	9	3010018-000	Probe Receptacle	
14	6	804206-01	Battery Grommet	
16	6	802278-02	Battery Pin	

Masimo SpO2 Connector Kit, MIN 3011608-026

The following is a list of the items in this Replacement kit.

Item	Qty	MIN	Part Description	Note
W22	1	3203369-000	SpO2 Cable Assembly	
412	1	3203956-000	Housing, Ferrite	
414	1	202253-760	Nylock Screw, 4-40 × .250 L	
234	4	3205311-000	Pan Torx, Nylock Screw, 4-40 × .500 L	

(Continued on next page)

Therapy PCB Kit – **Biphasic Devices**, MIN 3011608-027

The following is a list of the items in this Replacement kit.

Item	Qty	MIN	Part Description	Note
A03	1	3006235-014	Therapy PCB Assembly, Biphasic	
132	1	3009678-005	Cable Assembly	
144	1	3009558-002	Option Shield	
150	1	3010591-010	Rear Case EMI Shield	
336	2	200804-102	Flat Washer, .312 OD × .125 ID	

Therapy PCB Kit – **Monophasic Devices**, MIN 3011608-034

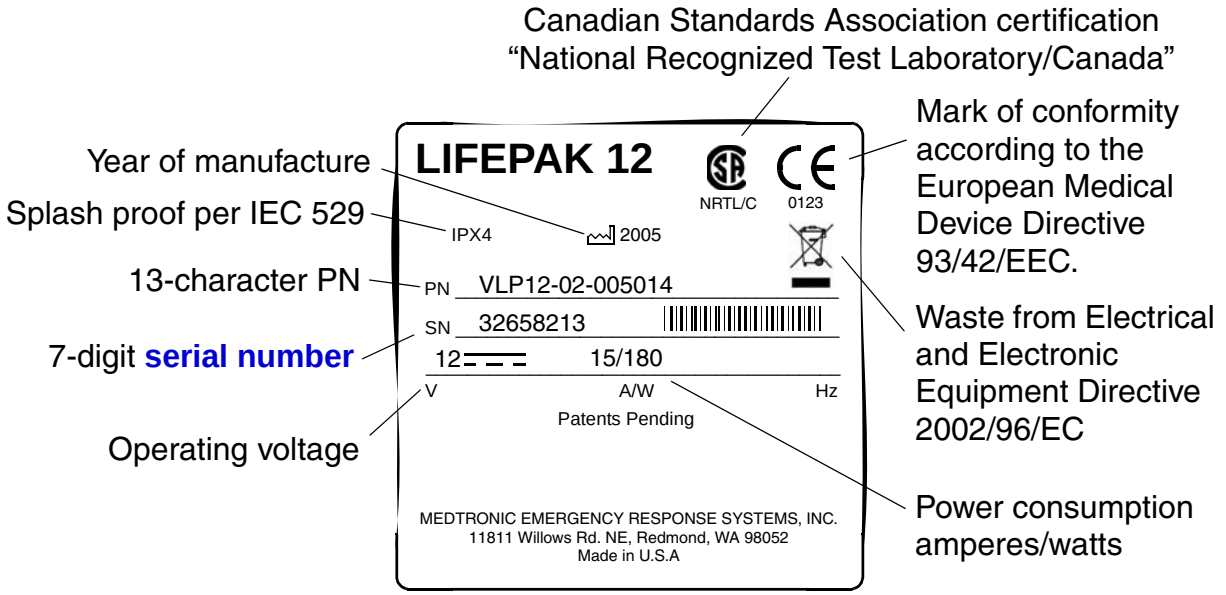
The following is a list of the items in this Replacement kit.

Item	Qty	MIN	Part Description	Note
A03	1	3006235-012	Therapy PCB Assembly, Monophasic	
132	1	3009678-005	Cable Assembly	
144	1	3009558-002	Option Shield	
150	1	3010591-010	Rear Case EMI Shield	
336	2	200804-102	Flat Washer, .312 OD × .125 ID	

Defibrillator Part Number and Serial Number

PN and SN Label

The LIFEPAK 12 defibrillator/monitor serial number (SN) and part number (PN) are noted on a label on the rear case assembly in Battery Well 1.



Understanding the Part Number

The device part number, for example, VLP12-02-005014, reflects the device options, features, language, operating power, and so forth.

(Continued on next page)

Defibrillator Part Number and Serial Number *(continued)*

Understanding the Serial Number

The serial number for the LIFEPAK 12 defibrillator/monitor is related to the sales order created during device manufacturing and appears on the serial number label in Battery Well 1. Use this number when calling to order parts.

Note: Devices with a **Manufacturing Date** before April 30, 1998, reference two separate serial numbers. The higher serial number, the Finished Device serial number, appears on the serial number label in Battery Well 1, while the lower serial number, the Common Device serial number, appears on CODE SUMMARY printouts and on the **Device Log** in the service mode. When tracking devices by serial number, be sure to use the number from the serial number label.

How to Order Parts

Ordering Parts

To order parts, contact your local Medtronic representative. In the USA, call PARTSLINE at 1.800.442.1142. Provide the part number and serial number located on the device label in Battery Well 1. Specify all assembly numbers, MINs, reference designations, and descriptions. Parts may be substituted to reflect device modifications and improvements.

Manufacturing Date

In some cases when ordering parts, you may also need the device manufacturing date. This date is available for viewing by accessing the SERVICE/STATUS/DEVICE LOG and noting the MANUFACTURING DATE. To access the DEVICE LOG, refer to **About the Device Log** and review the information for the MANUFACTURING DATE.

Serial Number

The serial number of the device identifies the manufacturing conditions and elements used in producing your device. When ordering parts, use the serial number (SN) listed on the label in Battery Well 1.

LIFEPAK 12 Defibrillator/Monitor Series

Performance Inspection Procedure Checklist

Medtronic

Model # _____

Serial # _____ **Department/Location** _____

Type of PIP: **Post-Repair** ❒ **Annual** ❒ **Performed By** _____

Date _____

Inspection		Pass	Fail	NA	Comments
A	**Physical Inspection (General)**	❒	❒	❒	
	Therapy Cable/Connector Condition	❒	❒	❒	
B	**User-Selected Manual Mode**	User-Selected Manual Access: _____			

Testing		Pass	Fail	N/A	Comments
1	**Power On**				
	a. Record software version that appears during Self Test	Version: 3011371-_____			
	b. Confirm the Service indicator is off	❒	❒	❒	
	c. Confirm the device completes the Power On sequence	❒	❒	❒	
2	**Record Operating Data**				

Total Shocks _____

360 J Shocks [ ] _____

225-325 J Shocks [ ] _____

0-200 J Shocks [ ] _____

Power Cycle Count _____
Pacing Count (if installed) _____
Shock Count _____
Power On Time _____
Printer On Time _____
SpO2 Operating Time (if installed) _____
CO2 Operating Time (if installed) _____
NIBP Inflation Cycles (if installed) _____
Defib Storage Cap Value (if Monophasic) _____

		Pass	Fail	N/A	Comments
3	**Keypads**				
	Confirm all control text boxes are highlighted	❒	❒	❒	
4	**Printer**				
	Confirm printed test strip and CHECK PRINTER message	❒	❒	❒	
5	**Audio**				
	Confirm voice messages and tones are clear and not distorted	❒	❒	❒	
6	**Biphasic Energy Setting Test** [N/A - for monophasic Device]				
	Confirm Lowest setting available for Energy 1	❒	❒	❒	
7	**User Test**				
	Confirm UUT passes User Test	❒	❒	❒	
8	**Time and Date**				
	Confirm Time and Date are correct	❒	❒	❒	
9	**12-Lead ECG Characteristics** [Alternative: 3-Lead ECG Characteristics]				
	a. Confirm leads off screen messages	❒	❒	❒	
	b. Record 12-Lead [3-Lead] ECG gain (tolerance 36 to 44 mm)	Lead II - Amplitude: _____mm			
10	**QUIK-COMBO Delivered Energy** [Alternative: Standard Paddles Delivered Energy]				
	10 J – Record delivered energy (tolerance 9.0 to 11.0 J).	Energy Level: _____ J			
	200 J– Record delivered energy (tolerance 186.0 to 214.0 J).	Energy Level: _____ J			
	360 J– Record delivered energy (tolerance 334.8 to 385.2 J).	Energy Level: _____ J			

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Testing		Pass	Fail	N/A	Comments
11	**QUIK-COMBO Synchronous Cardioversion** [Alternative: Standard Paddles Synchronous Cardioversion]				
	Record Sync delay (maximum 60 ms):	Sync:_____ms			
12	**QUIK-COMBO ECG Characteristics** [Alternative: Standard Paddles ECG Characteristics]				
	a. Record QUIK-COMBO ECG, Paddle gain (tolerance 36 to 44mm; 38 to 50 mm with QED-6).	Amplitude: _____ mm			
	b. Record Fast-Restore duration (maximum 12.5 mm).	Duration: _____ mm			
13	**Standard Paddles User Test** [N/A - for QUIK-COMBO only device]				
	Confirm UUT passes Standard Paddles User Test	❒	❒	❒	
14	**Advisory Mode Test** [N/A if no ADVISORY button present on UUT]				
	Verify Advisory LED lights and ADVISORY message appears.	❒	❒	❒	
15	**No Advisory Mode Test** [N/A if ADVISORY button is present on UUT]				
	Verify ADVISORY message does NOT appear.	❒	❒	❒	Manual Access Setting: _____
16	**Pacer Option Characteristics** [N/A if Pacing option is not installed]				
	a. Confirm leads off detection.	❒	❒	❒	
	b. 10 mA – Record current (tolerance 5 to 15 mA).	Current Level: ____ mA			
	100 mA– Record current (tolerance 95 to 105 mA).	Current Level: ____ mA			
	200 mA– Record current (tolerance 190 to 210 mA).	Current Level: ____ mA			
	c. Record pulse width (tolerance 19.0 to 21.0 ms).	Pulse Width: _____ ms			
17	**No Pacer Option Characteristic** [N/A if UUT contains Pacing option]				
	Confirm successful pacing calibration routine.	❒	❒	❒	
18	**Impedance Sense**				
	a. Confirm display of PADDLES LEADS OFF message. [370 ohms]	❒	❒	❒	
	b. Confirm no display of PADDLES LEADS OFF message. [238 ohms]	❒	❒	❒	
19	**ECG Analog Output** (optional, perform as required)				
	Record signal amplitude (tolerance 0.85 to 1.15 Vp-p).	Amplitude: _____ Vp-p			
20	**SpO2 Oximeter** [N/A if SpO2 option is not installed]				
	Confirm SpO2 reading is between 90% and 100%.	❒	❒	❒	
21	**Capnometer** [N/A if EtCO2 option is not installed]				
	a. Confirm change in vacuum reading is less than 20 mBars.	❒	❒	❒	
	b. Confirm CO2 concentration reading is 5% ±0.5%.	❒	❒	❒	
22	**Blood Pressure Meter** [N/A if NIBP option is not installed]				
	a. Confirm 50 mmHg, 100 mmHg, 150 mmHg, and 200 mmHg readings agree within ±3 mmHg.	❒	❒	❒	
	b. Confirm the overpressure switch activates at 285 mmHg ±10 mmHg.	❒	❒	❒	
	c. Confirm LEAKAGE TEST OK message.	❒	❒	❒	
23	**Invasive Blood Pressure** [N/A if IP option is not installed]				
	a. Confirm P1 pressure channel zero	❒	❒	❒	
	b. Confirm 250 ±9 mmHg, 200 ±8 mmHg, 100 ±6 mmHg, 40 ±5 mmHg, and 20 ±4 mmHg	❒	❒	❒	
	c. Confirm -20 ±4 mmHg	❒	❒	❒	
	d. Confirm P2 pressure channel zero	❒	❒	❒	
	e. Confirm 250 ±9 mmHg, 200 ±8 mmHg, 100 ±6 mmHg, 40 ±5 mmHg and 20 ±4 mmHg	❒	❒	❒	
	f. Confirm -20 ±4 mmHg	❒	❒	❒	
24	**Modem PC Card** [N/A - if Modem PC Card is not installed]				
	Confirm PC Card DIALING message.	❒	❒	❒	
25	**LIFENET BLUE Test** [N/A - if Bluetooth PC Card is not installed]				
	a. LIFENET BLUE test complete	❒	❒	❒	

BACK NEXT

Testing (continued)	Pass	Fail	N/A	Comments
26 **Voice Recorder Accessory** [N/A - if Voice Recorder Accessory is not installed]				
a. Voice Recorder Accessory test complete	❒	❒	❒	
27 **LIFEPAK 12 Maintenance Instruction**				
Maintenance Prompt Disabled or Reset	❒	❒	❒	
28 **Battery Power Source Management**				
Confirm battery switching.	❒	❒	❒	

Battery Operated Device Testing (N/A if A/C Power Adapter is attached)	Pass	Fail	N/A	Comments
29 **Therapy QUIK-COMBO Source Leakage Current Lead-Lead** [Alternative: Paddles Source Leakage Current Lead-Lead]				
Lead-Lead, Lead - **LA**, Neutral **Closed**, Polarity **Normal** (<10 µA)	❒	❒	❒	
30 **ECG 12-Lead Source Leakage Current Lead-Lead** [Alternative: ECG 3-Lead Source Leakage Current Lead-Lead]				
Lead-Lead, Lead - **RL** (RA*,LA*,LL*,V1-V6), Neutral **Closed**, Polarity **Normal** (<10 µA) [***** = 3-Lead only]	❒	❒	❒	
38 **Therapy QUIK-COMBO Sink Leakage Current** [Alternative: Paddles Sink Leakage Current]				
Lead Iso, Lead - **All**, Neutral **Closed**, Polarity **Normal** (QUIK-COMBO, 120V = <50 µA, 240V = <100 µA) (Paddles, 120V = <100 µA, 240V = <500 µA)	❒	❒	❒	
39 **ECG 12-Lead Sink Leakage Current** [Alternative: ECG 3-Lead Sink Leakage Current]				
Lead Iso, Lead - **All**, Neutral **Closed**, Polarity **Normal** (<50 µA)	❒	❒	❒	
40 **SpO2 Sink Leakage Current** [N/A if SpO2 option is not installed]				
Lead Iso, Lead - **C**, Neutral **Closed**, Polarity **Normal** (120V = <100 µA, 240V = <500 µA)	❒	❒	❒	

Power Adapter Operated Device Testing	Pass	Fail	N/A	Comments
31 **Power Source Management** (including DC Power Adapter)				
a. Confirm auxiliary power switching.	❒	❒	❒	
b. Confirm defibrillator charge current with auxiliary power.	❒	❒	❒	
32 **Chassis Leakage Current**				
a. **Chassis**, Lead - **All**, Neutral **Closed**, Polarity **Normal/Reversed** (<100 µA)	❒	❒	❒	N/A for DC-PA
b. **Chassis**, Lead - **All**, Neutral **Closed**, Polarity **Normal/Reversed**, **Lift Gnd** (120V = <300 µA, 240V = <500 µA)	❒	❒	❒	N/A for DC-PA
33 **Earth Leakage Current**				
a. **Earth**, Lead - any, Neutral **Closed**, Polarity **Normal** (<2500 µA)	❒	❒	❒	N/A for DC-PA
b. **Earth**, Lead -any, Neutral **Open**, Polarity **Normal** (<5000 µA)	❒	❒	❒	N/A for DC-PA
34 **Therapy QUIK-COMBO Source Leakage Current Lead-Gnd** [Alternative: Paddles Source Leakage Current Lead-Gnd]				
a. **Lead-Gnd**, Lead - **All**, Neutral **Closed**, Polarity **Normal/Reversed** (<10 µA)	❒	❒	❒	N/A for DC-PA
b. **Lead-Gnd**, Lead - **All**, Neutral **Closed**, Polarity **Normal/Reversed**, **Lift Gnd** (<50 µA)	❒	❒	❒	N/A for DC-PA
35 **Therapy QUIK-COMBO Source Leakage Current Lead-Lead** [Alternative: Paddles Source Leakage Current Lead-Lead]				
a. **Lead-Lead**, Lead - **LA**, Neutral **Closed**, Polarity **Normal/Reversed** (<10 µA)	❒	❒	❒	N/A for DC-PA
b. **Lead-Lead**, Lead - **LA**, Neutral **Closed**, Polarity **Normal/Reversed**, **Lift Gnd** (<50 µA)	❒	❒	❒	N/A for DC-PA
36 **ECG 12-Lead Source Leakage Current Lead-Gnd** [Alternative: ECG 3-Lead Source Leakage Current Lead-Gnd]				
a. **Lead-Gnd**, Lead - **All**, Neutral **Closed**, Polarity **Normal/Reversed** (<10 µA)	❒	❒	❒	N/A for DC-PA
b. **Lead-Gnd**, Lead - **All**, Neutral **Closed**, Polarity **Normal/Reversed**, **Lift Gnd** (<50 µA)	❒	❒	❒	N/A for DC-PA
37 **ECG 12-Lead Source Leakage Current Lead-Lead** [Alternative: ECG 3-Lead Source Leakage Current Lead-Lead]				
a. **Lead-Lead**, Lead - **RL** (RA*,LA*,LL*,V1-V6), Neutral **Closed**, Polarity **Normal/Reversed** (<10 µA) [***** =3-Lead only]	❒	❒	❒	N/A for DC-PA
b. **Lead-Lead**, Lead - **RL** (RA*,LA*,LL*,V1-V6), Neutral **Closed**, Polarity **Normal/Reversed**, **Lift Gnd** (<50 µA) [***** = 3-Lead only]	❒	❒	❒	N/A for DC-PA
38 **Therapy QUIK-COMBO Sink Leakage Current** [Alternative: Paddles Sink Leakage Current]				
Lead Iso, Lead - **All**, Neutral **Closed**, Polarity **Normal** (QUIK-COMBO, 120V = <50 µA 240V = <100 µA) (Paddles, 120V = <100 µA, 240V = <500 µA)	❒	❒	❒	DC-PA, see previous page, N/A this page
39 **ECG 12-Lead Sink Leakage Current** [Alternative: ECG 3-Lead Sink Leakage Current]				
Lead Iso, Lead - **All**, Neutral **Closed**, Polarity **Normal** (<50 µA)	❒	❒	❒	DC-PA, see previous page, N/A this page
40 **SpO2 Sink Leakage Current** [N/A if SpO2 option is not installed]				
Lead Iso, Lead - **C**, Neutral **Closed**, Polarity **Normal** (120V = <100 µA, 240V = <500 µA)	❒	❒	❒	DC-PA, see previous page, N/A this page

Testing		Pass	Fail	N/A	Comments
AC / DC Power Adapter PIP [For repaired or standalone Power Adapters]					
1	**Power Source Management**				
	a. Confirm auxiliary power switching.	❒	❒	❒	
	b. Confirm defibrillator charge current with auxiliary power.	❒	❒	❒	
2	**Power Adapter Chassis Leakage Current** [N/A - Section for DC Power Adapters]				
	a. **Chassis**, Lead - **All**, Neutral **Closed**, Polarity **Normal/Reversed** (<100 µA)	❒	❒	❒	
	b. **Chassis**, Lead - **All**, Neutral **Closed**, Polarity **Normal/Reversed**, **Lift Gnd** (120V = <300 µA, 240V = <500 µA)	❒	❒	❒	
3	**Power Adapter Earth Leakage Current** [N/A - Section for DC Power Adapters]				
	a. **Earth**, Lead - any, Neutral **Closed**, Polarity **Normal** (<2500 µA)	❒	❒	❒	
	b. **Earth**, Lead -any, Neutral **Open**, Polarity **Normal** (<5000 µA)	❒	❒	❒	
4	**Power Adapter QUIK-COMBO Source Leakage Current** [N/A - Section for DC Power Adapters]				
	a. **Lead-Gnd**, Lead - **All**, Neutral **Closed**, Polarity **Normal/Reversed** (<10 µA)	❒	❒	❒	
	b. **Lead-Gnd**, Lead - **All**, Neutral **Closed**, Polarity **Normal/Reversed**, **Lift Gnd** (<50 µA)	❒	❒	❒	

BACK

Numerics

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