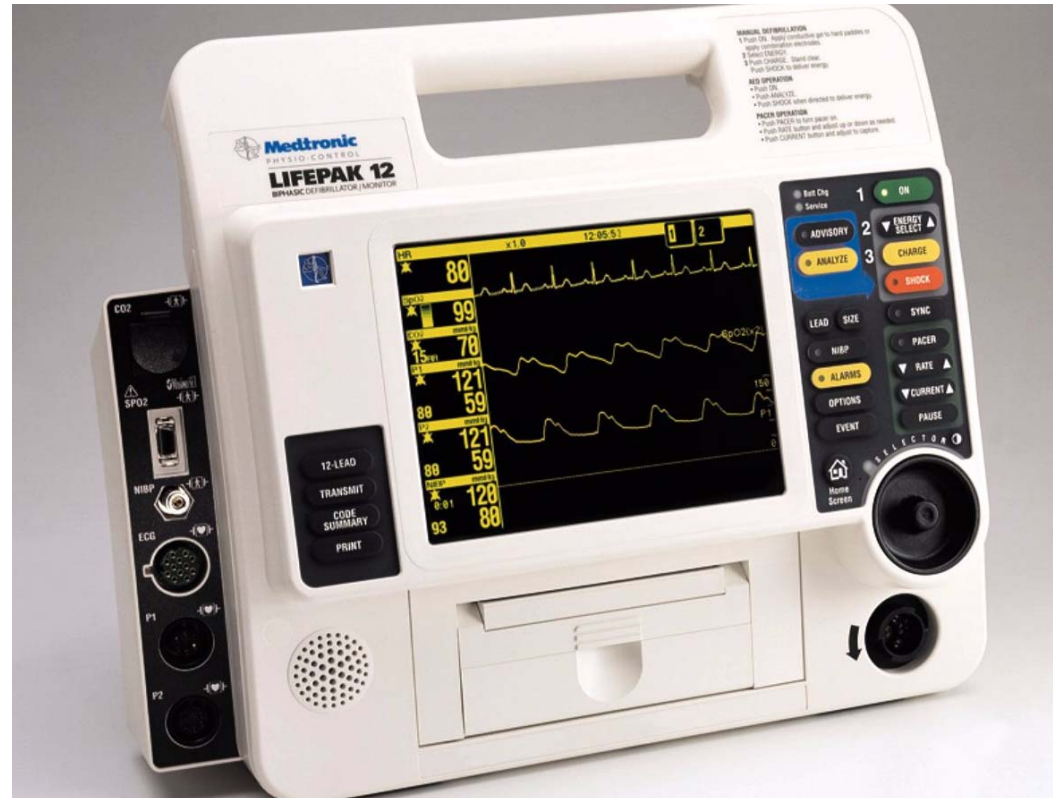


SERVICE MANUAL

LIFEPAK® 12

Defibrillator/Monitor Series



Click a Topic

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Preface

This service manual describes how to maintain, test, troubleshoot, and repair the LIFEPAK 12 defibrillator/monitor (device). 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 the name of a button, menu, menu item, indicator, screen message, or screen overlay appears in all caps, for example, ADVISORY button and SETUP menu.

This section covers the following topics:

Trademarks

Using Adobe Reader

Navigating Through the Manual

Service Personnel Qualifications

Contacting Physio-Control

Responsibility for Information

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Preface

(continued)

Device Tracking

Service Information

Recycling Information

Warranty

Configuration Information

Glossary

Acronyms

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Using Adobe Reader

Accessing Adobe Reader Help

This service manual opens in Adobe® Reader, which is included on this documentation CD. For additional assistance using the Adobe Reader program, access ADOBE READER HELP in the HELP menu.

Using Bookmarks

Bookmarks appear in a column on the left side of the screen. They enable you to easily navigate to main sections of the manual, similar to a table of contents.

To view or hide the bookmarks column, click the BOOKMARKS tab located along the left side of the screen.



To jump to a bookmark topic, click the desired topic.

Note: A plus sign to the left of a bookmark topic indicates additional topics exist under that bookmark level. Click the plus sign to expand or collapse the bookmarks.







Using Page View

Click the PAGES tab located to the far left of the screen to view miniature images of each page in the document. Scroll through the pages and click an image to jump quickly to that page.

Navigating Through the Manual

Blue text indicates a hyperlink. Click a link to jump to that topic or page. Click  **Back** in the navigation bar (at the bottom of each page) to return to your previous location. The pointer changes to a pointing finger  when positioned over a link. A navigation bar at the bottom of each page also provides helpful links.

The navigation bar includes:

-  **Table of Contents** Click to jump to the main table of contents for the manual.
-  **Section Contents** Click to jump to the table of contents for the section you are currently viewing.
- **Index**  Click to jump to the manual's index.
-  **Back** Click to retrace your steps in a document, returning to each page in the reverse order visited.
- **Next Page**  Click to jump to the next page of the manual.
-  **Previous Page** Click to jump to the previous page of the manual.

Service Personnel Qualifications

Service technicians must be properly qualified and thoroughly familiar with the operation of the LIFEPAK 12 defibrillator/monitor. They 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 Physio-Control

Physio-Control, Inc.
11811 Willows Road NE
Redmond, WA 98052-2003 USA
Telephone: 425.867.4000
Toll Free (USA only): 800.442.1142
Fax: 1.425.867.4121
Internet: www.physiocontrol.com

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 this manual and the *LIFEPAK 12 Defibrillator/Monitor Series Operating Instructions* to obtain a complete understanding of the use and maintenance of the LIFEPAK 12 defibrillator/monitor.

It is the responsibility of our customers to ensure that the appropriate person(s) within their organization has access to the information in this service manual, including any warnings and cautions used throughout the 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 device has been sold, donated, lost, stolen, exported, or destroyed, or if it was not obtained directly from Physio-Control, please notify the device-tracking coordinator at 1.800.426.4448. See your *LIFEPAK 12 Defibrillator/Monitor Series Operating Instructions* for more information regarding device tracking.

Service Information

Before attempting to clean or repair any assembly in the LIFEPAK 12 defibrillator/monitor (device), the service technician should be familiar with the information provided in the **Preventive Maintenance** section of this manual.

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

Replacement procedures for the device are limited to those items accessible at the final assembly level. Replacements and adjustments must be made by qualified service personnel. Replacements at the final assembly level simplify repair and servicing procedures and help ensure correct device operation and calibration.

To obtain service and maintenance for your device, contact your local Physio-Control service or sales representative. In the USA, call Physio-Control Technical Service at 1.800.442.1142. Outside the USA, contact your local Physio-Control representative. When you call Physio-Control to request service, provide the following information:

- Model number and part number
- Serial number
- Observation of the problem that led to the call

Recycling Information

Recycle the LIFEPAK 12 defibrillator/monitor at the end of its useful life.

- Recycling assistance – The device should be recycled according to national and local regulations. Contact your local Physio-Control 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 provided in this service manual for [discarding/recycling batteries](#).
- Packaging – Packaging should be recycled according to national and local regulations.

Warranty

See the warranty statement included in the “Maintaining the Equipment” section of the operating instructions.

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
- CASMED® NIBP monitoring option
- Oridion® CO2 option
- Fax/data communication option
- Bluetooth® communication option
- 100-mm 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 technology — Property of the shock waveform generated by the biphasic LIFEPAK 12 defibrillator/monitor. 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, see Appendix D in the operating instructions.
- **CODE SUMMARY™** report — A summary report that includes the ECG segments associated with key events, such as analysis or shock. See “Data Management” in the operating instructions 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 ALARMS (manual mode). The CPSS operates in conjunction with the Shock Advisory System (SAS). For more information about CPSS and SAS, see Appendix D in the operating instructions.
- End-tidal carbon dioxide (CO₂) monitoring — The EtCO₂ monitor is a capnometric and capnographic device that measures the amount of CO₂ during each breath, displays the CO₂ waveform, and reports the amount present at the end of exhalation as an indication of breathing efficacy (EtCO₂).
- 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.

Glossary *(continued)*

- Noninvasive blood pressure (NIBP) monitoring — The NIBP monitor is a noninvasive oscillometric blood pressure monitor. The NIBP monitor inflates an occluding cuff and determines systolic and diastolic pressures, mean arterial pressure (MAP), and pulse rate. Pressure measurements are reported in mmHg or kPa, and pulse rate is measured in beats per minute (bpm).
- 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 to operate the LIFEPAK 12 defibrillator/monitor.
- REDI-PAK™ preconnect system — A variant of the QUIK-COMBO pacing/defibrillation/ECG electrode system. The system allows QUIK-COMBO pacing/defibrillation/ECG electrode cable connection without removing the electrodes from their air-tight sealed pouch until needed.
- Shock Advisory System (SAS) — A computerized ECG analysis system for use in detecting a shockable rhythm. For more information about CPSS and SAS, see Appendix D in the operating instructions.

(Continued on next page)

Glossary *(continued)*

- Pulse Oximeter (SpO₂) monitoring — A pulse oximeter is a noninvasive device that checks the saturation of oxygen in arterial blood (SpO₂).
- Test load — Equipment 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
Ah	Ampere hour
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
CO ₂	Carbon dioxide
CPR	Cardiopulmonary resuscitation
CPU	Central processing unit
CPSS	Continuous patient surveillance system

(Continued on next page)

Acronyms *(continued)*

Term	Description
DDE	Disposable defibrillation electrodes
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
EtCO ₂	End-tidal carbon dioxide
HR	Heart rate
IEC	International Electrical Commission
IP	Invasive pressure
LCD	Liquid crystal display
LED	Light-emitting diode

(Continued on next page)

Acronyms *(continued)*

Term	Description
MDS	Monophasic damped sinusoidal
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

Acronyms *(continued)*

Term	Description
RTS	Radio transparent system
SAS	Shock Advisory System
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

General Warnings and Cautions

Symbols

Terms

The following terms are used in this service manual or on the various configurations of the LIFEPAK 12 defibrillator/monitor (device). 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 (device). 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 external 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.

(Continued on next page)

General Warnings and Cautions *(continued)*

WARNINGS! *(continued)*

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





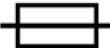







Type BF patient connection



Static-sensitive device (SSD)

Symbols *(continued)*

Page 2 of 7

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

(Continued on next page)

Symbols *(continued)*

	Indoor-use only
	Alarm on
	Alarm off
	VF/VT alarm on
	VF/VT alarm silenced
>	Greater than
<	Less than
J	Joules
	Contrast
	HOME SCREEN button

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



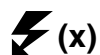
LIFEPAK NiCd battery in well, fully charged, not in use



LIFEPAK NiCd battery in well, discharged



Heart rate/pulse rate indicator



Shock count (x) on screen








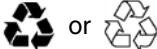




Mark of conformity according to the European Medical Device Directive 93/42/EEC













Canadian Standards Association certification for Canada and the United States

Symbols *(continued)*







	DC voltage
	AC voltage
	On (power: connection to the AC Mains)
	Off (power: disconnection from the AC Mains)
	Power on/off
	[signal] Input
	[signal] Output
	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.

(Continued on next page)

Symbols *(continued)*

	See 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

Symbols *(continued)*

	CO2 exhaust
	Chassis ground
	Recognized component mark for Canada and the United States
	LIFEPAK 12 to LIFEPAK 12 cable
	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 the physical characteristics and functionality of the LIFEPAK 12 defibrillator/monitor (device). Topics include input signals, assembly functions, and device outputs.

Introduction

Physical Description and Features

Devices, Options, Supplies, and Accessories

System Context Diagrams

Functional Descriptions

Introduction

About the Device

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

Energy Waveforms

The device 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 device 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 can 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, see Appendix D in the operating instructions.

(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 non-demand modes of operation
- Patient information capturing
 - 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 simultaneously
 - 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 (CO₂ and RR) monitoring (continuous display)
 - Waveforms display pace and sense markers
 - Ventricular fibrillation/ventricular tachycardia monitoring and alarm

(Continued on next page)

Introduction *(continued)*

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Device Primary Functions *(continued)*

- 12-lead ECG capture and analysis
 - Captures up to 45 minutes of continuous ECG data
 - Continuous printing of ECG data
 - Transmits ECG data to a remote site
 - Acquires and analyzes 12-lead data
- Alarms and warnings management
 - Places alarm limits on patient monitoring parameters
 - Automatic alarm limit reset at operator request
 - Activates or disables alarms and stores alarm events
 - Silences 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 device consists of a two-piece case assembly that encloses the following printed circuit boards (when fully configured with options):

- | | |
|---|--|
| 1. A01 System PCB | 7. A07 Contact PCB |
| 2. A02 Memory PCB | 8. A08 Backlight PCB (LCD) |
| 3. A03 Power PCB | 9. A16 SpO2 Module (Nellcor or Masimo) |
| 4. A04 Therapy PCB (monophasic or biphasic) | 10. A21 NIBP Module |
| 5. A05 Interface PCB | 11. A22 Biphasic Module |
| 6. A06 OEM PCB | 12. A23 Mini-CO2 Module |

... and the following subassemblies:

- | | |
|--|---|
| 1. A09 Small Keypad | 8. A17 Interconnect Bracket |
| 2. A10 Large Keypad | 9. W07 ECG Connector Cable |
| 3. A11 Display Assembly (LCD or EL) | 10. W08 System Connector Cable |
| 4. A12 Printer Assembly | 11. W09 Auxiliary Connector Cable, |
| 5. A13 Transfer Relay Assembly (monophasic or biphasic) | 12. W10 Battery Pins (4x) |
| 6. A14 Waveshaping Inductor (monophasic) / A14 Inductive Resistor (biphasic) | 13. W11 Therapy Connector Cable |
| 7. A15 Energy Storage Capacitor (monophasic or biphasic) | 14. W22 SpO2 Connector Cable |
| | 15. W15 Selector Assembly |
| | 16. W17 Speaker Assembly |
| | 17. C15 Pacing Capacitor |
| | 18. Associated labels, wiring, and hardware |

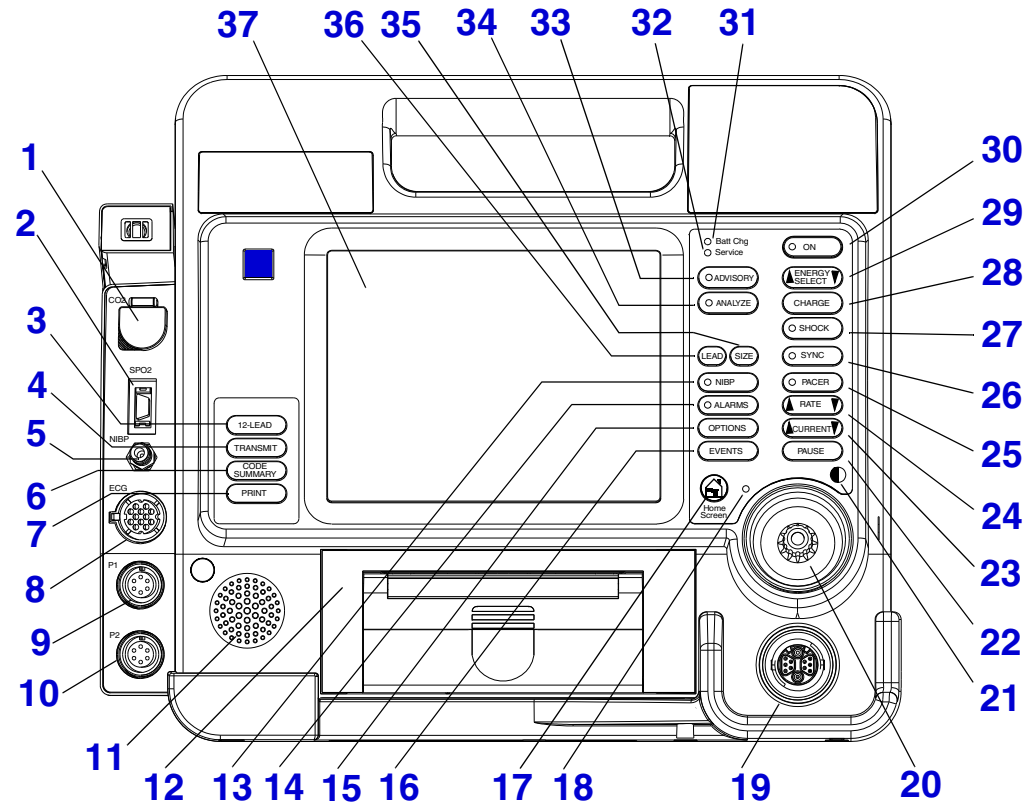
See the [Biphasic Interconnect Diagram](#).

Physical Description and Features

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Front Panel

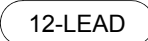

For information about buttons, indicators, or connectors, click the appropriate number on the following illustration:



(Continued on next page)

Physical Description and Features *(continued)*



Front Panel *(continued)*

Number	Description
1	CO2 connector (optional) — Intake port for the CO2 monitor, which continuously measures the amount of CO2 during each breath and reports the amount present at the end of exhalation (CO2).
2	SpO2 connector (optional) — Connection port for the pulse oximeter, which noninvasively checks the saturation of oxygen in arterial blood. SpO2 is used for monitoring patients who are at risk of developing hypoxemia.
3	 button (optional) — Press to initiate the acquisition, analysis, storage, and printing of a 12-lead ECG report.
4	 button — 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, which 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	 button — Press to print a summary of the current patient conditions, including patient name, critical event record, and ECG waveforms.
7	 button — Press to print a continuous ECG stripchart. Press again to stop printing.
8	ECG connector — Connection port 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	IP1 connector — Connection port for invasive pressure cables, which invasively measure arterial blood pressures, central venous pressure (CVP), or intracranial pressure.
10	IP2 connector — Connection port for invasive pressure cables, which invasively measure arterial blood pressures, central venous pressure (CVP), or intracranial pressure.

(Continued on next page)

Physical Description and Features *(continued)*





Front Panel *(continued)*

Number	Description
11	Speaker — Provides audio voice prompts and alert tones.
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, CO2 option, or invasive pressure where the 100 mm printer is standard.
13	 button (optional) — Press to initiate blood pressure measurement.
14	 button and indicator — Press to display the ALARMS overlay. The choices are: QUICK SET, LIMITS, SILENCE, and VF/VT ALARM. The indicator illuminates steadily when setting alarms and flashes when an alarm condition exists.

(Continued on next page)

Physical Description and Features *(continued)*



Front Panel *(continued)*

Number	Description
15	 button — Press to display the OPTIONS overlay. The choices are: PATIENT (for entering patient data), PACING (to set demand or non-demand pacing), DATE/TIME, ALARM VOLUME, REPORTS (for stored patient reports), PRINTER (to set the printer frequency response), and USER TEST.
16	 button — Press to display the EVENTS overlay. Your event choice is appended on to the patient report, together with a date/time stamp.
17	 HOME SCREEN button — Press to return to the home screen of the particular option or feature you are configuring. Pressing this button 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 — Illuminates when the SELECTOR (20) is active.

(Continued on next page)

Physical Description and Features *(continued)*




Front Panel *(continued)*

Number	Description
19	Therapy Connector — Connection point for the following: <ul style="list-style-type: none">■ 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 knob — When active, rotate (either direction) to select from a menu or overlay shown on the screen. When your choice is illuminated, press to enter.
21	 SCREEN CONTRAST button (LCD only) — Press to adjust the display screen contrast. Rotate the SELECTOR to the desired contrast, and then press to enter.

(Continued on next page)

Physical Description and Features *(continued)*


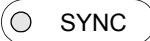

Front Panel *(continued)*

Number	Description
22	 button (optional) — Press and hold to pause the pacer at 25% of the set rate. While pressed, PAUSED appears before PPM at the bottom of the screen. Release to resume pacing at the set rate.
23	 button (optional) — Press to display the PACING overlay. Press the up or down arrows on the button to adjust the pacing current in 10 mA increments, or rotate the SELECTOR to change the current in 5 mA increments.
24	 button (optional) — Press to display the PACING overlay. Press the up or down arrows on the button to adjust the pacing rate in 10 ppm (pulses per minute) increments, or rotate the SELECTOR to change the rate in 5 ppm increments.

(Continued on next page)

Physical Description and Features *(continued)*



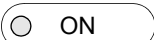

Front Panel *(continued)*

Number	Description
25	 button and indicator (optional) — Press to activate pacing and to illuminate the indicator. You must be in manual mode and have QUIK-COMBO leads attached or the indicator will not illuminate. Pressing this button trips the device out of the defibrillation mode, terminates synchronized cardioversion, and dumps any energy stored on the defibrillation capacitor.
26	 button 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 it again.
27	 button and indicator — Press to deliver energy in either advisory mode or manual mode. The indicator flashes when the device is fully charged. When operating with standard paddles, press the SHOCK buttons on the paddles to deliver energy.

(Continued on next page)

Physical Description and Features *(continued)*






Front Panel *(continued)*

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

(Continued on next page)

Physical Description and Features *(continued)*

Front Panel *(continued)*

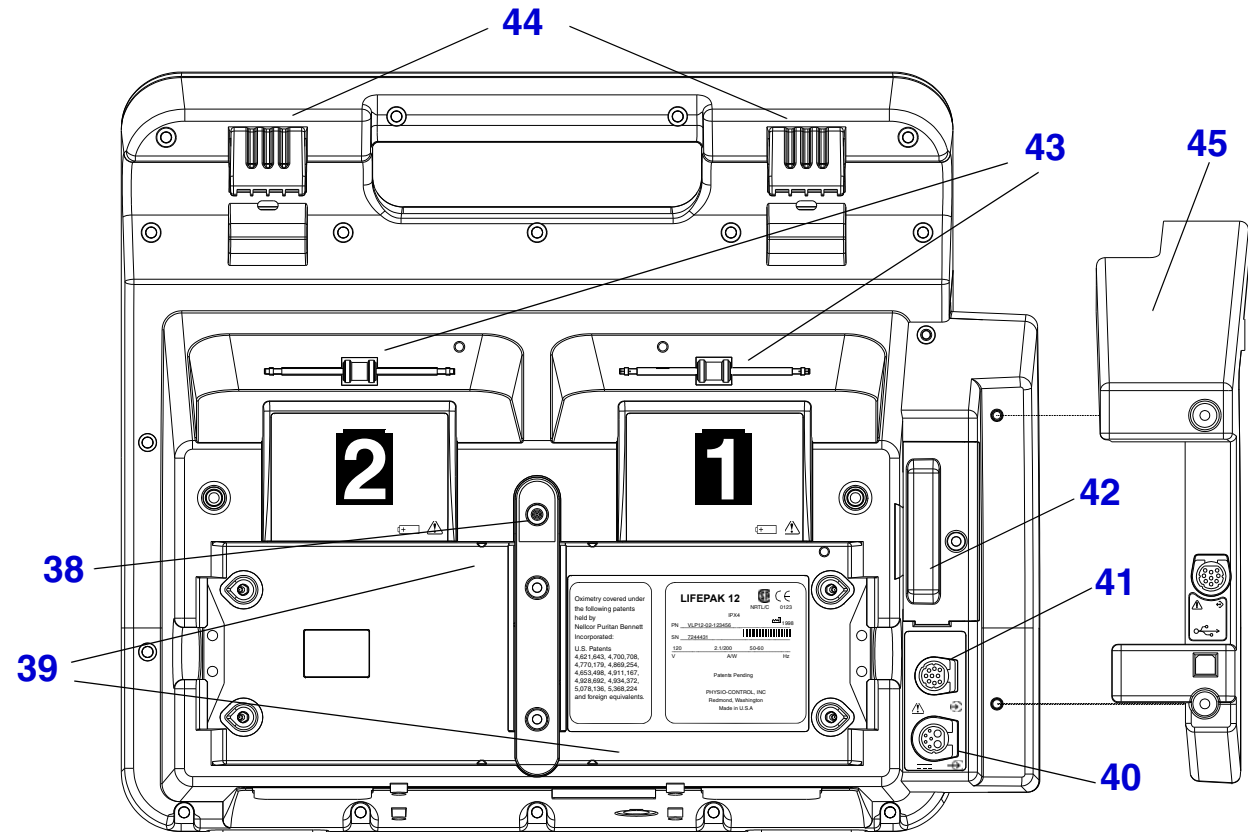
- 32**  indicator — Illuminates when service error codes are written into the error log (accessed in the **SERVICE** menu). See **Troubleshooting** for information about error codes.
-
- 33**  button and indicator — Press to switch between manual mode (indicator OFF) and advisory mode (indicator ON). In advisory mode, the continuous patient surveillance system (CPSS) monitors the patient's ECG for a potentially shockable rhythm.
-
- 34**  button and indicator — Press to activate the Shock Advisory System (SAS) in advisory mode, which analyzes the patient's ECG for a potentially shockable rhythm. The indicator illuminates when the SAS is active.
-
- 35**  button — Press to select ECG lead for lead set.
-
- 36**  button — Press to select ECG lead size.
-
- 37** Display screen — The electroluminescent (EL) or liquid crystal display (LCD) screen displays information such as operating messages, waveforms, status messages, and setup overlays.
-

(Continued on next page)

Physical Description and Features *(continued)*

Page 11 of 13

Rear Panel

*(Continued on next page)*

Physical Description and Features *(continued)*

Rear Panel *(continued)*

Number	Description
38	CO2 exhaust port (optional) — Vents gasses from CO2 monitor.
39	Battery compartments — Accommodate two removable battery packs that provide power for the LIFEPAK 12 defibrillator/monitor.
40	Auxiliary connector — Connection port for an external power adapter.
41	System connector — Connection port 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 to transfer setup options.
42	PC Card™ slot — Accepts modem cards.
43	Standard paddle wells — Storage area for a set of standard paddles.
44	Gurney hooks — Used to mount the defibrillator monitor on 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 the CODE-STAT™ data management system.

(Continued on next page)

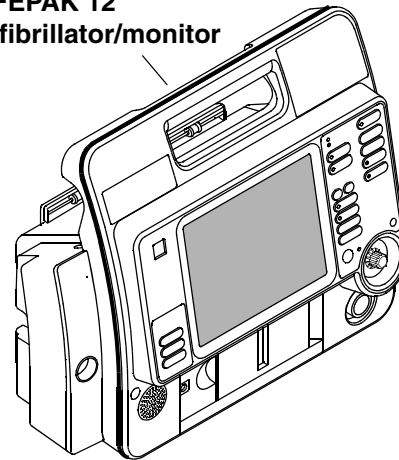
Physical Description and Features *(continued)*

Page 13 of 13

What Is Shipped with a Basic Device

A basic device includes the components shown below.

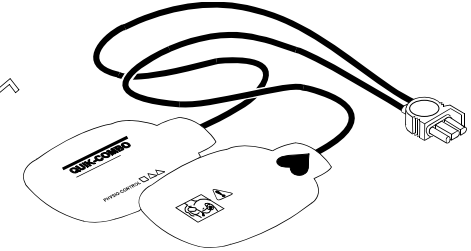
LIFEPAK 12
defibrillator/monitor



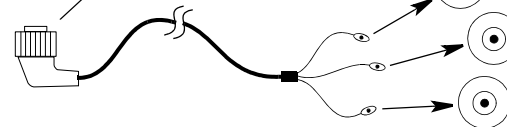
QUIK-COMBO
therapy cable



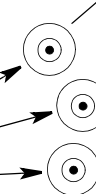
QUIK-COMBO
electrodes



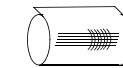
3-lead ECG
cable



(3-pack) ECG
electrodes



(3) rolls 50 mm
printer paper



operating
instructions



Devices, Options, Supplies, and Accessories

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

Item	Description	Reference	
LIFEPAK12 defibrillator/monitor			
Basic device	Device with 50 mm printer includes: <ul style="list-style-type: none"> ■ 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)

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

Item	Description
Optional Features	
Pacing	Upgradable in the field. Accessories: <ul style="list-style-type: none"> ■ QUIK-COMBO therapy cable
SpO2 (Nellcor or Masimo)	Masimo is upgradable in the field. Accessories: <ul style="list-style-type: none"> ■ Nellcor or Masimo SpO2 sensors ■ SpO2 sensor extender cable
CO2	Upgradable in the field. Accessories: <ul style="list-style-type: none"> ■ Airway adapter ■ FilterLine® ■ Nasal FilterLine
NIBP	Upgradable in the field. Accessories: <ul style="list-style-type: none"> ■ Reusable blood pressure cuff ■ Disposable blood pressure cuff

(Continued on next page)

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

Item	Description
Optional Features <i>(continued)</i>	
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.
IP	Upgradable in the field. Accessories: See the operating instructions for IP accessories.
12-lead ECG	Upgradable in the field, includes: <ul style="list-style-type: none"> ■ 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

(Continued on next page)

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

Item	Description
Optional Features <i>(continued)</i>	
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)

Devices, Options, 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
External sterilizable paddles (attach to standard paddles)	Pair
Invasive pressure	Invasive pressure cable Invasive pressure transducer See the operating instructions

(Continued on next page)

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

Item	Description
Electrodes	
QUIK-COMBO multifunctional ECG electrodes with EDGE System™ technology	<ul style="list-style-type: none"> ■ 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)

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

Item	Description
Power Options	
Batteries (two per device)	<ul style="list-style-type: none"> ■ FASTPAK NiCd ■ FASTPAK 2 NiCd (with fuel gauge) ■ LIFEPAK NiCd (with fuel gauge) ■ LIFEPAK SLA
Battery support systems	<ul style="list-style-type: none"> ■ 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	<ul style="list-style-type: none"> ■ AC power adapter (includes power cord and built-in output cable) ■ Extension output cable for AC power adapter

(Continued on next page)

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

Item	Description
Data Management and Communications	
Voice recording	Upgradable in the field, includes: <ul style="list-style-type: none"> ■ 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: <ul style="list-style-type: none"> ■ Bluetooth internal PC Card ■ Reference guide
Modems	<ul style="list-style-type: none"> ■ Internal modem PC Card, 55.6K (PC Card and cable) ■ Modem door assembly (required for internal modem PC Card) ■ External modem (requires an external modem adapter cable) ■ External modem adapter cable — 6 feet ■ External modem adapter cable — 10 feet

(Continued on next page)

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

Item	Description
Data Management and Communications <i>(continued)</i>	
Cables	<ul style="list-style-type: none"> ■ Device-to-PC serial port interface cable (connects 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)
PC Software	<ul style="list-style-type: none"> ■ CODE-STAT data management system for PCs

(Continued on next page)

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

Item	Description
Training Tools	
FAST-PATCH	<ul style="list-style-type: none"> ■ 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	<ul style="list-style-type: none"> ■ 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	<ul style="list-style-type: none"> ■ Defibrillation checker ■ Test load — for use with QUIK-COMBO therapy cable only

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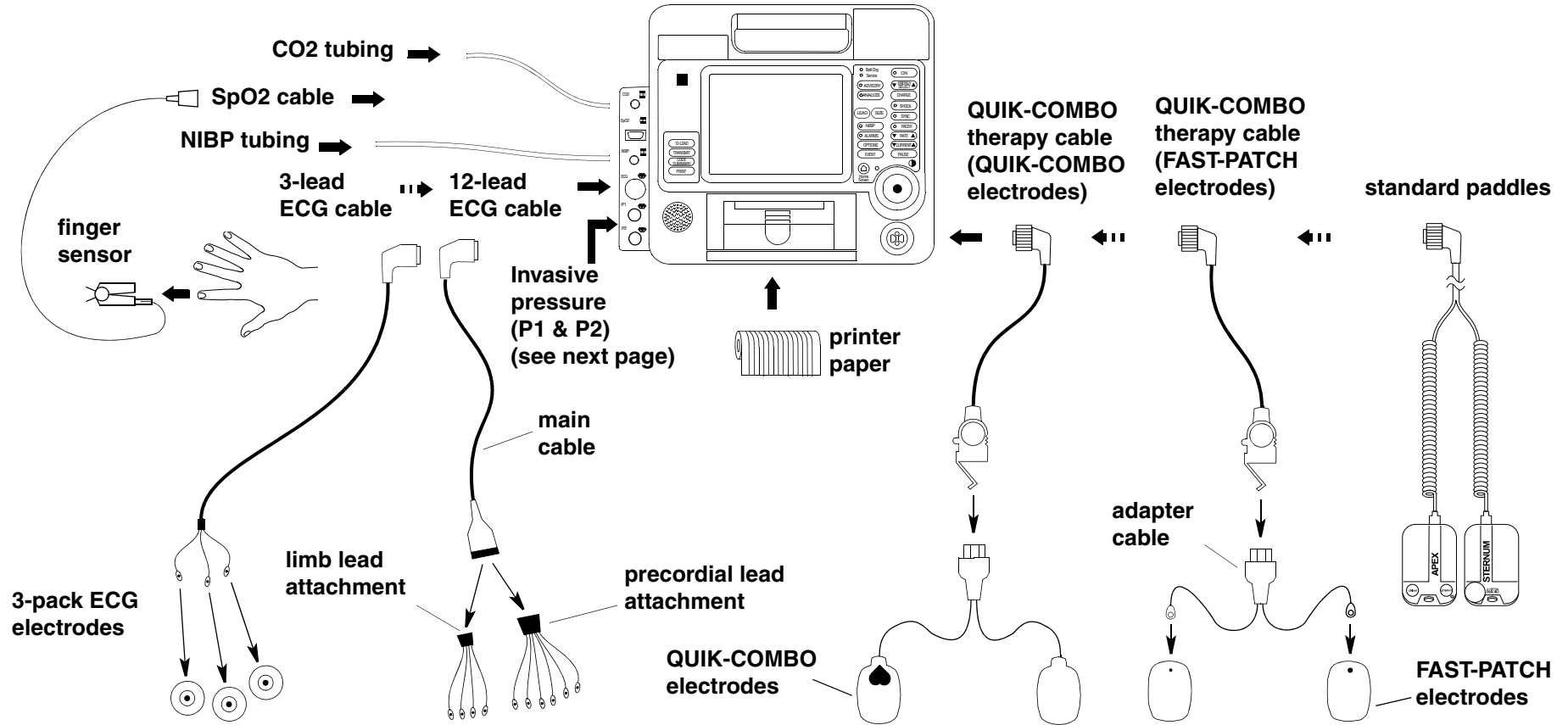
Devices, Options, Supplies, and Accessories *(continued)*

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	
Carrying bags	<ul style="list-style-type: none"> ■ 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
Supplies	
Printer paper	<ul style="list-style-type: none"> ■ 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 gel	■ Use with hard paddles

System Context Diagrams

Front of Device

The following diagrams illustrate how the device connects to external equipment, including accessories, batteries, and auxiliary power adapters.



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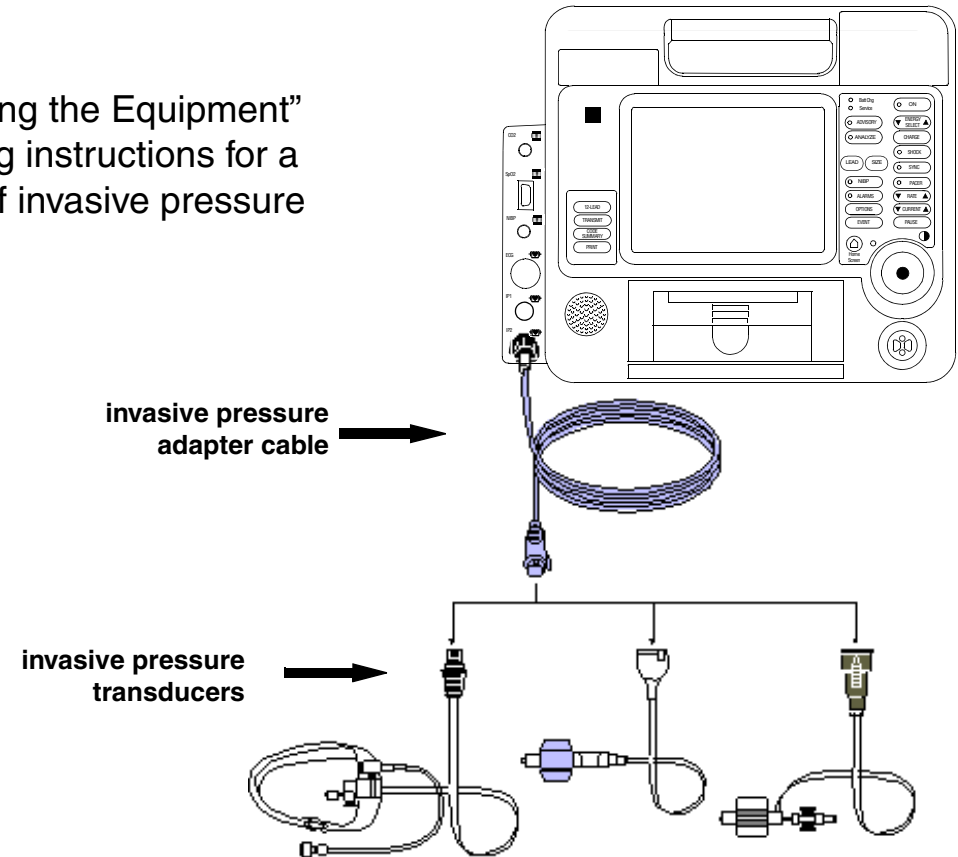
System Context Diagrams *(continued)*

Page 2 of 3

Front of Device *(continued)*

The following diagram illustrates how the device connects to invasive pressure equipment.

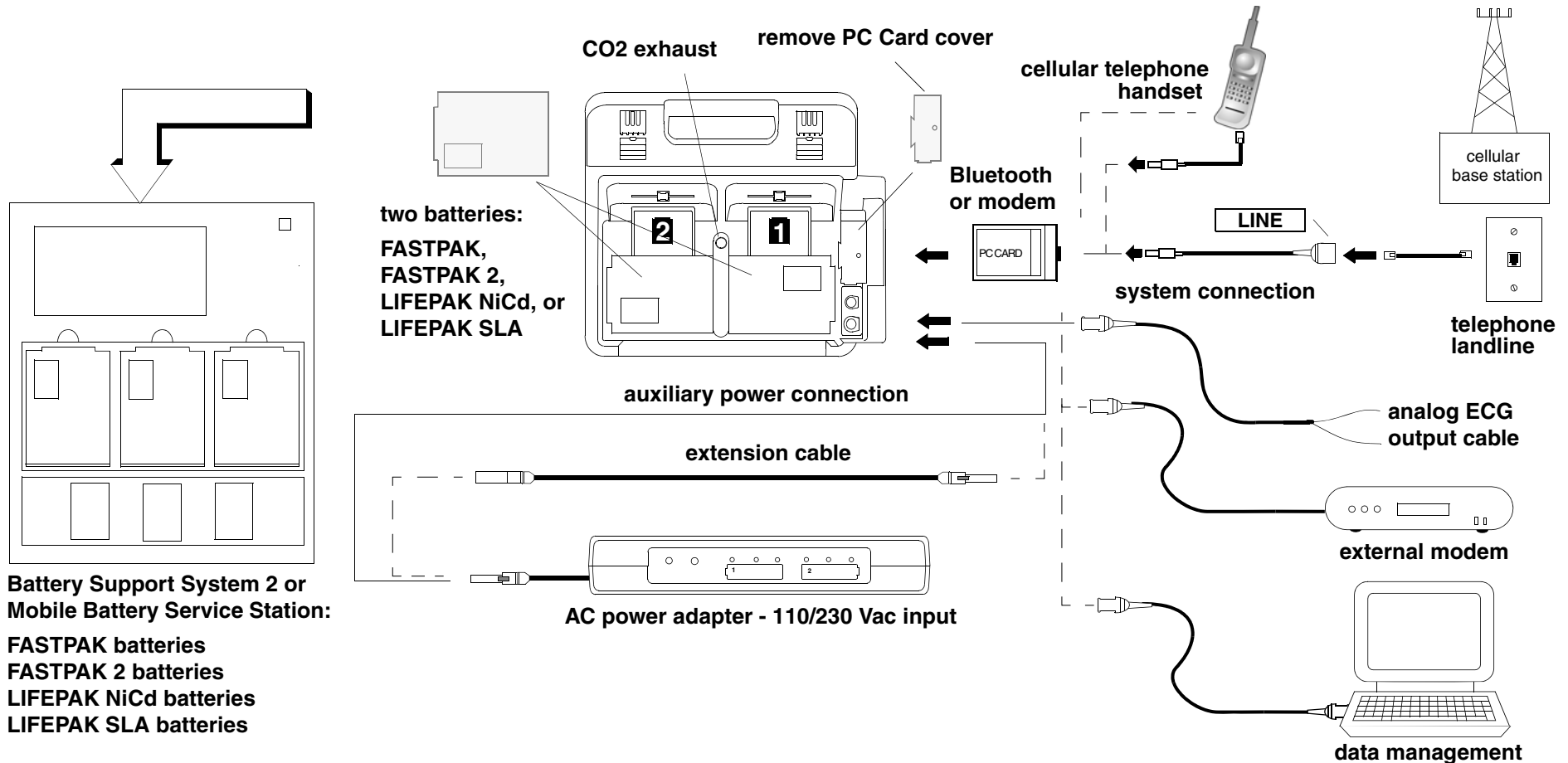
See “Maintaining the Equipment” in the operating instructions for a complete list of invasive pressure accessories.



(Continued on next page)

System Context Diagrams *(continued)*

Back of Device



Functional Descriptions

The LIFEPAK 12 defibrillator/monitor series (device) is a platform medical device capable of combining a variety of therapeutic and monitoring features. In addition to manual defibrillation, semi-automatic defibrillation, and noninvasive pacing, the device offers optional oximetry, invasive pressure, noninvasive blood pressure, CO₂, and 12-lead ECG monitoring. A key feature of the device 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.

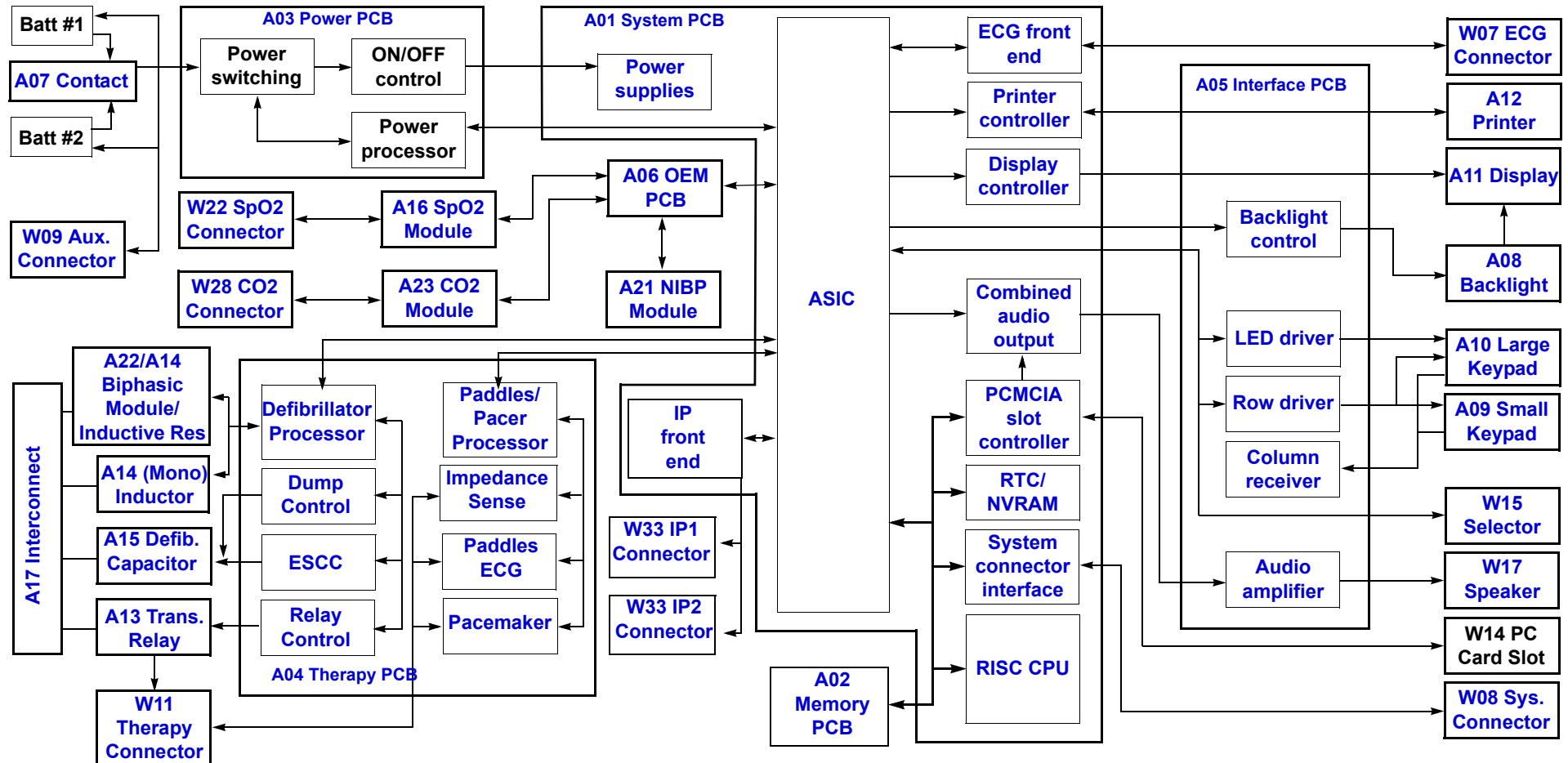
The functional descriptions that follow provide a basic understanding of the device design and assist the qualified service technician in troubleshooting to the subassembly level. Troubleshooting below the subassembly level, outside the factory, is not recommended, nor is it within the scope of this service manual to provide the detail necessary to support such repairs.

See the [system block diagram](#) when necessary as you review the functional descriptions.

(Continued on next page)

Functional Descriptions *(continued)*

This system block diagram is linked to the corresponding descriptive text.



(Continued on next page)

Functional Descriptions *(continued)*

A01 System PCB

The A01 System PCB integrates and controls all functions of the device. There are two primary components:

- 32-bit **Reduced Instruction Set Computer (RISC processor)**, which functions as the central processing unit (CPU) for intensive number-processing tasks.
- **Application-Specific Integrated Circuit (ASIC)**, which operates as the interface between the CPU and all other therapeutic, monitoring, data management, and display device subsystems.

The following discussion identifies the 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 Descriptions *(continued)*

A01 System PCB *(continued)*

- **ECG front end** — The device 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 being used 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 device 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, where the IP preamplifier circuitry is located.

(Continued on next page)

Functional Descriptions *(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 device 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 device uses a modem PC Card (PCMCIA) 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 Descriptions *(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 Physio-Control proprietary file), and calibration data. The RTC/NVRAM is powered by a lithium coin cell battery.
- **System connector interface** — The device can be connected to external equipment for transmitting analog ECG signal output, data transmission, factory test, Physio-Control field service data collection, and device configuration during field upgrade. Except for analog ECG signals, all data communication at the system connector is 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 the following two components:

- Dual universal asynchronous receiver/transmitter (DUART)
- Level-shifter, used for converting device internal logic levels to RS-232 levels.

(Continued on next page)

Functional Descriptions *(continued)*

Page 7 of 21

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

The 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 Descriptions *(continued)*

A03 Power PCB

The A03 Power PCB manages application of power to the device 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, etc.), and applies charging currents from an attached power adapter to the batteries.

When the device 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 device is ON triggers an orderly device shutdown prior to turning off SW_VB.

(Continued on next page)

Functional Descriptions *(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 ECG paddles, and monitors attachment of the QUIK-COMBO electrodes.

The major subsystems of the A04 Therapy PCB and their basic functions are as follows:

- **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 Descriptions *(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 button (or external paddles SHOCK buttons), 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, power removal, pacing activation, and QUIK-COMBO leads-off). 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 device 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 Descriptions *(continued)*

A04 Therapy PCB *(continued)*

Leads-off/motion detection relies on two main characteristics:

- Leads-off/motion detector output impedance is relatively high (greater than 125 k Ω).
- 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 perform 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 Descriptions *(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 Descriptions *(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 device. 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 (for 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 ON LEDs receive their drive from the A03 Power PCB Power Processor.

(Continued on next page)

Functional Descriptions *(continued)*

A05 Interface PCB *(continued)*

- **Keypad row driver** — The A01 System PCB ASIC reads device control buttons using a row and column address scheme (that is, each button 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 button rows in the A09 Small Keypad and A10 Large Keypad. A button closure enables row drive for a unique button to be sensed at the keypad column receiver.
- **Keypad column receiver** — The A01 System PCB ASIC reads button closures serially from the Interface keypad column receiver (a parallel-to-serial converter). In practice, closure of a device button passes row drive for that button 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 signal (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 Descriptions *(continued)*

A06 OEM PCB

A PCB used to integrate monitoring modes supplied to Physio-Control by third parties, or original equipment manufacturers (OEMs), into the device 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 are installed.

A07 Contact PCB

Interfaces the LIFEPAK NiCd and SLA (sealed lead-acid) battery edge connector with the device. 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 Descriptions *(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 buttons on these keypads varies, depending on the features installed in a specific device. All buttons, with the exception of ON and SHOCK, are addressed by the user controls section of the A01 System PCB ASIC.

- The ON button remains separate from the addressed buttons because it is needed to activate and deactivate the device without ASIC interaction. Closures of the ON button are applied to the A03 Power PCB On/Off control block.
- The SHOCK button remains separate from the addressed buttons as a matter of fail-safe design, thus preventing inappropriate activation under conditions of loss of CPU control. Operator-initiated closures of the SHOCK button is 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 Descriptions *(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 device uses one of the following printers:

- The 50-mm printer is used when the 12-lead ECG monitoring capability is absent.
- The 100-mm printer is installed to support 12-lead ECG monitoring.

A13 Transfer Relay Assembly

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 Biphasic 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 Biphasic Module.

(Continued on next page)

Functional Descriptions *(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 – Defibrillator 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 perform the TCP – Defibrillator 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 (Monophasic Devices Only)

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.

A17 Interconnect Bracket (Biphasic Devices Only)

A terminal assembly used to interconnect the A13 Transfer Relay Assembly, A22 Biphasic Module, 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 Descriptions *(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 by means of the A06 OEM PCB to the A01 System PCB ASIC for display. Readings may be taken one time or on a recurring interval.

A22 Biphasic Module (Biphasic Devices Only)

The biphasic 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 CO2 Module - Mini-CO2 Module

An OEM capnometry module is supplied by Oridion Medical Ltd. This module continuously monitors end-tidal carbon dioxide (CO2) and respiratory rate. Measurement results pass serially by means of the A06 OEM PCB to the A01 System PCB ASIC for display. The Mini-CO2 module has a smaller form factor with dimensions of 3.0"x 3.0"x 1.125".

W07 ECG Connector Cable

A front panel connector port 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.

(Continued on next page)

Functional Descriptions *(continued)*

W08 System Connector Cable

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

W09 Auxiliary Connector Cable

A rear panel access port used for connection of external power adapters.

W11 Therapy Connector Cable

A patient connector 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 the 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.

(Continued on next page)

Functional Descriptions *(continued)*

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 on 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**.

W17 Speaker Assembly

Used to announce 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 port on the parameter bezel used for attaching a Nellcor or Masimo SpO2 (oximeter) sensor. The Nellcor W22 SpO2 connector cable required two versions, MP-205 with gray cable and Nell-3 with black cable.

W28 CO2 Inlet Connector Cable

A front panel connector port used for attaching a CO2 FilterLine. Signal processing takes place on the CO2 module.

W33 IP Connector Cable

A front panel connector port used for attaching invasive pressure transducers.

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](#)

[Automated External Defibrillator \(AED\) Mode](#)

[Setup Mode](#)

[Service Mode](#)

[Inservice 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, press ADVISORY to enter manual mode.

The factory default configuration allows direct access to manual mode. This access can be modified to require confirmation or a passcode, or can be restricted entirely. To change manual mode access, select MANUAL MODE in 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 (also called advisory 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 ADVISORY to enter AED mode.

There are no restrictions when going from manual mode to AED mode.

For information about using the device in AED mode, see the “Therapy” section in the operating instructions.

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 other options. 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. When the setup is complete, turn off the device to save the configuration. The next time the device is turned on, the operating defaults you selected are active.

Preserving the Existing Setup Configuration

Restoring the existing setup configuration after service is complete can be accomplished using either of the following methods:

- The best method is to **transfer the existing setup configuration** to another LIFEPAK 12 defibrillator/monitor. When service is complete, transfer the configuration back to the original device.
- The second method is to **print the existing setup configuration**. When service is complete, verify the setup and manually reset the configuration.

(Continued on next page)

Setup Mode *(continued)*

Note: Transferring and saving the setup configuration requires that the software in the spare device receiving the setup configuration is of the same revision. Otherwise, potentially unexpected results may occur once the configuration has been restored to the repaired device.

Note: To transfer and save the setup configuration, both devices must have the same energy configurations (both monophasic or both biphasic). Otherwise, the configuration information for default energy will be corrupted.

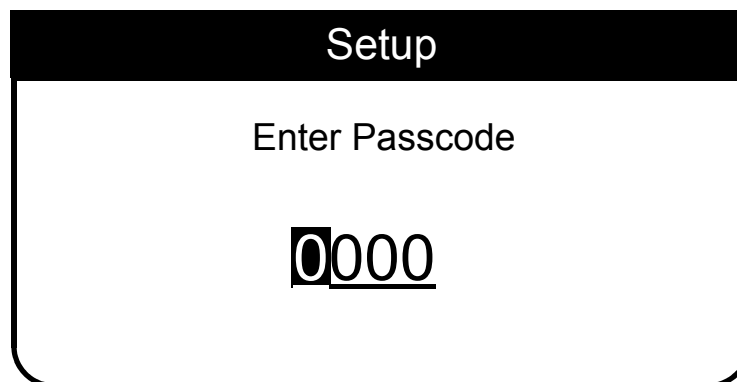
(Continued on next page)

Setup Mode *(continued)*

Displaying the Setup Menu

◆ To display the SETUP menu:

1. Press and hold OPTIONS and EVENT, and then turn the device ON. Continue holding until the setup passcode prompt appears. The factory default passcode is 0000; the reserved technician passcode is 5433.



2. To enter the passcode, rotate the SELECTOR to select a digit, and then press the SELECTOR to continue. After the last digit is entered, the SETUP menu appears.

(Continued on next page)

Setup Mode *(continued)*

Displaying the Setup Menu *(continued)*

3. Rotate the SELECTOR to choose a setup category, and then press the SELECTOR to display the category submenu.

Setup	
General...	Printer...
Manual Mode...	Transmission...
Advisory Mode...	Clock...
Pacing...	Reset Defaults...
Monitoring...	Print Defaults
12-Lead...	Send Config...
Events...	Set Passcode...
Alarms...	Service...

For more detailed information about SETUP menu options, see “Defining Setup Options” in the operating instructions.

Service Mode

About Service Mode

Service mode functions allow qualified service personnel to:

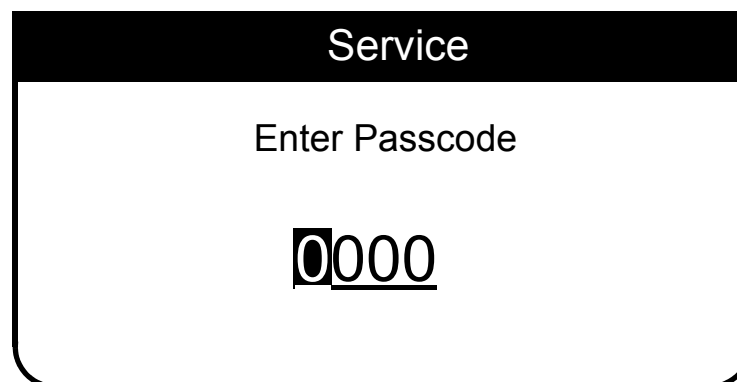
- Perform device calibration routines:
 - Defibrillation calibration
 - Pacing calibration
 - Printer calibration
 - CO2 calibration
 - NIBP calibration
- Perform device tests:
 - Buttons test
 - Contrast test
 - Pixels test
 - Printer test
 - Voice/Tone test
- View the device status registers:
 - Device 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)*

Displaying the Service Menu

- ◆ To display the SERVICE menu:
 1. Display the **SETUP** menu.
 2. Rotate the SELECTOR to select SERVICE in the SETUP menu, and then press the SELECTOR. The service passcode prompt appears. The factory default passcode is 0000; the reserved technician passcode is 5433.

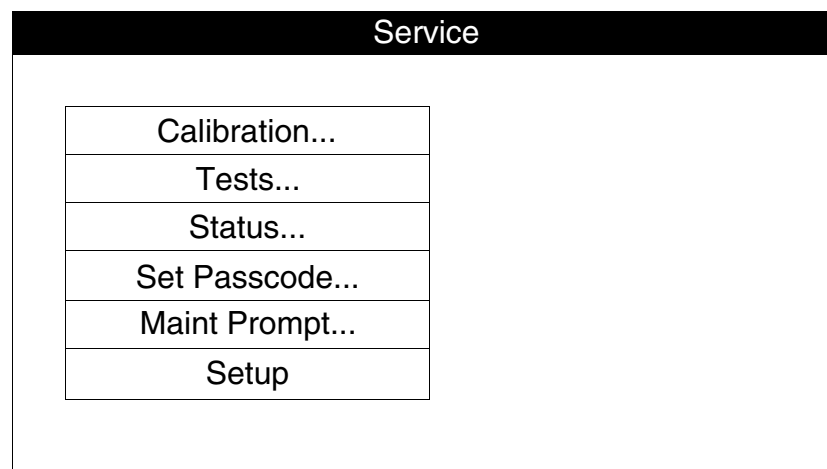


3. To enter the passcode, rotate the SELECTOR to select a digit, and then press the SELECTOR to continue. After the last digit is entered, the SERVICE menu appears.

(Continued on next page)

Service Mode *(continued)*

Displaying the Service Menu *(continued)*



4. Rotate the SELECTOR to select a service option, and then press the SELECTOR to display the option overlay.

Calibration — See Test and Calibration Procedures (TCP).

Tests — See Performance Inspection Procedures (PIP).

Status — See [Troubleshooting](#).

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

Maint Prompt — See [Preventive Maintenance](#).

Inservice Mode

About Inservice Mode

Inservice mode allows you to practice or demonstrate the monitoring functions of the LIFEPAK 12 defibrillator/monitor, including:

- ECG lead selection
- SpO2
- CO2
- 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, etc.). You cannot enter inservice mode if any front panel cable is attached.
2. Press and hold EVENT and HOME SCREEN, and then turn on the device. Continue holding until the inservice mode message appears at the bottom of the display screen.

See “Inservice Mode” in the operating instructions for additional information.

Troubleshooting

This section describes error code usage, interpretation, and corrective action. It includes a separate troubleshooting chart keyed to the Performance Inspection Procedures (PIP) section and individual troubleshooting tests that require operator interpretation. Choose from the following topics:

Troubleshooting Chart

Using the Service/Status Features

Device Log

Error Log

Counters

Clear Memory

Processing Error Codes

Error Code Categories

Utility Error Code Table

User Interface Error Code Table

Data Management Error Code Table

System Monitor Error Code Table

Processor Control Error Code Table

ECG Error Code Table

Patient Parameter Error Code Table

Therapy Error Code Table

(Continued on next page)

Troubleshooting

(continued)

Printer Error Code Table

Power Management Error Code Table

Serial Communication Error Code Table

Obsolete Error Codes (Versions Earlier Than -099)

Corrective Action Codes

Service Indicator

Device User Test

Contrast Test – LCD Only

Pixels Test

Modem PC Card Test

12-Lead/3-Lead ECG Fast Restore Test

Fast Restore Test Fixture

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 Procedure .
	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 battery pin(s); replace if necessary. Check A03 Power PCB; replace if necessary.
	SERVICE indicator remains ON	See Processing Error Codes for assistance.

Troubleshooting Chart *(continued)*

Area	Observed Symptom	Suggested Corrective Action
Power On/Self Test <i>(continued)</i>	MAINTENANCE DUE indicator remains ON	Reset the Maintenance Prompt Interval. See Maintenance Prompt Interval Setup.
LCD Display	Improper LCD response	Perform Pixels Test. Check A11 LCD Assembly; replace if necessary. Check A01 System PCB; replace if necessary.
EL Display	Improper EL response	Perform Pixels Test. Check A11 LCD Assembly; replace if necessary. Check A01 System PCB; replace if necessary.
Keypads	Improper button response	Check A09 Small Keypad; replace if necessary. Check A10 Large Keypad; replace if necessary. Check A05 Interface PCB; replace if necessary. Check A01 System PCB; replace if necessary.
Printer	Missing dots in printed "X"	Verify use of proper printer paper. Clean the printhead (100 mm printer). Check A12 Printer Assembly; replace if necessary.
	One or more horizontal lines missing or distorted	Check A01 System PCB; replace if necessary.

(Continued on next page)

Troubleshooting Chart *(continued)*

Page 3 of 12

Area	Observed Symptom	Suggested Corrective Action
Printer <i>(continued)</i>	Missing or broken characters	Verify use of proper paper. Clean the printhead (100 mm printer). Check A12 Printer Assembly; replace if necessary . Check A01 System PCB; replace if necessary .
	Improper 25 mm marker spacing	Calibrate the printer .
	CHECK PRINTER screen message appears	Clean the paper sensor . Verify that the printer paper is correctly loaded. Check A12 Printer Assembly; replace if necessary .
Audio	Inaudible or garbled audio	Check W17 Speaker Assembly; replace if necessary. Check A05 Interface PCB; replace if necessary . Check A01 System PCB; replace if necessary .

(Continued on next page)

Troubleshooting Chart *(continued)*

Area	Observed Symptom	Suggested Corrective Action
Power Source Management		Verify instructions and retry test. Substitute another battery and retry test. Check battery pin(s); replace if necessary . Check test battery; replace if necessary. Check power adapter; replace if necessary. Check A03 Power PCB; replace if necessary . Check A03 Power PCB fuses; replace if necessary.
QUIK-COMBO or Standard Paddles Delivered Energy	No energy discharge	Verify test setup and retry test. See Processing Error Codes for assistance. Check Therapy Cable or Standard Paddles; replace if necessary. Check W11 Therapy Connector Cable; replace if necessary . Check A04 Therapy PCB; replace if necessary . Check A22 Biphasic Module PCB; replace if necessary . Check A13 Transfer Relay Assembly; replace if necessary . Check A14 Inductive Resistor (Biphasic); replace if necessary . Check A15 Energy Storage Capacitor; replace if necessary .
	Delivered energy out of tolerance	Perform Defibrillator Calibration.

(Continued on next page)

Troubleshooting Chart *(continued)*

Area	Observed Symptom	Suggested Corrective Action
QUIK-COMBO Impedance Sense	Inappropriate screen message response	Verify test setup and retry test. Check therapy cable; replace if necessary. Check W11 Therapy Connector Cable; replace if necessary . Check A04 Therapy PCB; replace if necessary .
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 A01 System PCB; replace if necessary .
	Failure to transfer coincident with Sync mark	Take device out of Sync and attempt to discharge. Test keypads . Check standard paddles; replace if necessary.

Troubleshooting Chart *(continued)*

Area	Observed Symptom	Suggested Corrective Action	
User Test	Service indicator illuminates, User Test fails	<p>Cycle device power; repeat User Test.</p> <p>If an AC power adapter is in use, wait 2 seconds after disconnecting from line power, turn device ON, and repeat User Test.</p> <p>Access ERROR LOG and clear error codes.</p>	
	Sync discharge time exceeds 60 ms	<p>Verify test setup and retry test.</p> <p>Check A01 System PCB; replace if necessary.</p>	
Pacer Option Characteristics	Inappropriate screen message or alarm response	<p>Verify test setup and retry test.</p> <p>Check therapy cable; replace if necessary.</p> <p>Check ECG cable; replace if necessary.</p> <p>Check W11 Therapy Connector Cable; replace if necessary.</p> <p>Check W07 ECG Connector Cable; replace if necessary.</p> <p>Check A10 Large Keypad; replace if necessary.</p> <p>Check A04 Therapy PCB; replace if necessary.</p>	
		Peak current levels out of tolerance	Perform Pacer Self-Calibration.
		Pacer pulse width out of tolerance	Check A04 Therapy PCB; replace if necessary.

(Continued on next page)

Troubleshooting Chart *(continued)*

Area	Observed Symptom	Suggested Corrective Action
No Pacer Option Characteristic	Inappropriate screen message response	Check A04 Therapy PCB; replace if necessary.
12-Lead ECG Characteristics	Inappropriate screen message response	Verify test setup and retry test. Check ECG cable; replace if necessary. Check W07 ECG Connector Cable; replace if necessary. Check A09 Small Keypad; replace if necessary.
	ECG gain out of tolerance	Verify test setup and retry test. Check ECG cable; replace if necessary. Check A01 System PCB; replace if necessary.
3-Lead ECG Characteristics	Inappropriate screen message response	Verify test setup and retry test. Check ECG cable; replace if necessary. Check W07 ECG Connector Cable; replace if necessary. Check A09 Small Keypad; replace if necessary.
	ECG gain out of tolerance	Verify test setup and retry test. Check ECG cable; replace if necessary. Check A01 System PCB; replace if necessary. Check A04 Therapy PCB; replace if necessary.

Troubleshooting Chart *(continued)*

Area	Observed Symptom	Suggested Corrective Action
QUIK-COMBO ECG Characteristics	ECG gain out of tolerance	Verify test setup and retry test. Check therapy cable; replace if necessary. Check A04 Therapy PCB; replace if necessary . Check A01 System PCB; replace if necessary .
	ECG fast restore out of tolerance	Verify test setup and retry test. Check therapy cable; replace if necessary. Check A01 System PCB; replace if necessary .
Standard Paddles ECG Characteristics	ECG gain out of tolerance	Verify test setup and retry test. Check standard paddles; replace if necessary. Check A04 Therapy PCB; replace if necessary . Check A01 System PCB; replace if necessary .
	ECG fast restore out of tolerance	Verify test setup and retry test. Check standard paddles; replace if necessary. Check A04 Therapy PCB; replace if necessary .

Troubleshooting Chart *(continued)*

Area	Observed Symptom	Suggested Corrective Action
ECG Analog Output	Output waveform missing or out of tolerance	Verify test setup and retry test. Check analog ECG output cable; replace if necessary. Check W08 System Connector Cable; replace if necessary. Check A01 System PCB; replace if necessary.
Oximeter	Saturation reading missing or out of tolerance	Verify test setup and retry test. Retry test with another test subject. Check SpO2 finger probe; replace if necessary. Check W22 SpO2 Connector Cable; replace if necessary. Check A16 SpO2 Module; replace if necessary. Check A06 OEM PCB; replace if necessary.
Modem PC Card	Inappropriate screen message response	Verify test setup and retry test. Try another PC Card. Check W14 System PCB/PC Card Slot Cable; replace if necessary. Check A01 System PCB; replace if necessary.

Troubleshooting Chart *(continued)*

Page 10 of 12

Area	Observed Symptom	Suggested Corrective Action
Fax Transmission	Unable to complete Fax transmissions	Verify that the Fax modem card is installed. In the SETUP>TRANSMISSION>FAX>PORTS> INTERNAL CELL FAX overlay, 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 indicator OFF	Perform NIBP leakage test. Check A21 NIBP module; replace if necessary.
	NIBP monitor displays XXX in the NIBP region of the display with the SERVICE indicator ON	Check tubing between the NIBP connector and NIBP module for kinks or occlusions. Check A21 NIBP module; replace if necessary.

(Continued on next page)

Troubleshooting Chart *(continued)*

Area	Observed Symptom	Suggested Corrective Action
<p>CO2 Monitor</p> <p>Note: The CO2 module can take up to 6 minute for all internal processes to complete. If a CO2 failure mode is present, the SERVICE indicator LED may turn ON after internal processes complete.</p>	<p>CO2 monitor fails calibration</p>	<p>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 for pinched hose inside device. Check A23 CO2 module; replace if necessary.</p>
	<p>CO2 monitor displays FilterLine Blockage message</p>	<p>Replace FilterLine. Check input tubing between CO2 connector and CO2 module for kinks or occlusions. Check A23 CO2 module; replace if necessary.</p>
	<p>CO2 monitor displays XXX in the CO2 region of the display with SERVICE indicator OFF</p>	<p>Replace FilterLine. Check for pinched hose inside device. Check A23 CO2 module; replace if necessary.</p>
	<p>CO2 displays XXX in the CO2 region with SERVICE indicator ON</p>	<p>Review error codes 92xx.</p>

Troubleshooting Chart *(continued)*

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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 AC power adapter; replace if necessary. Check and repair/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 AC power adapter; replace if necessary. 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 AC power adapter; replace if necessary. Check and repair/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 AC power adapter; replace if necessary. Check and repair/restore proper internal wire routing.

Using the Service/Status Features

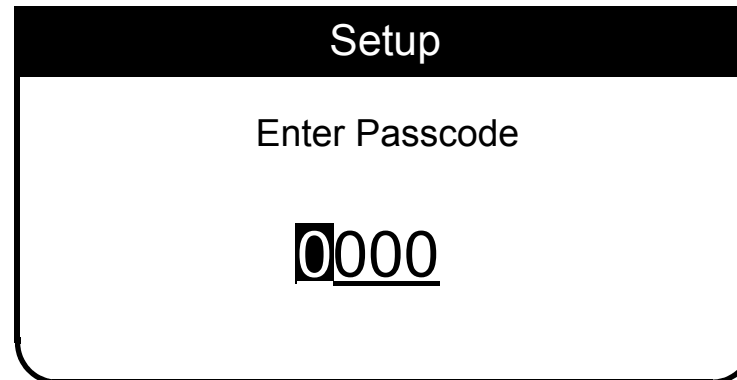
Introduction

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 Submenu

◆ To display the SERVICE/STATUS submenu:

1. Press and hold the OPTIONS and EVENT buttons, and then turn the device ON. Continue holding until the setup passcode prompt appears.

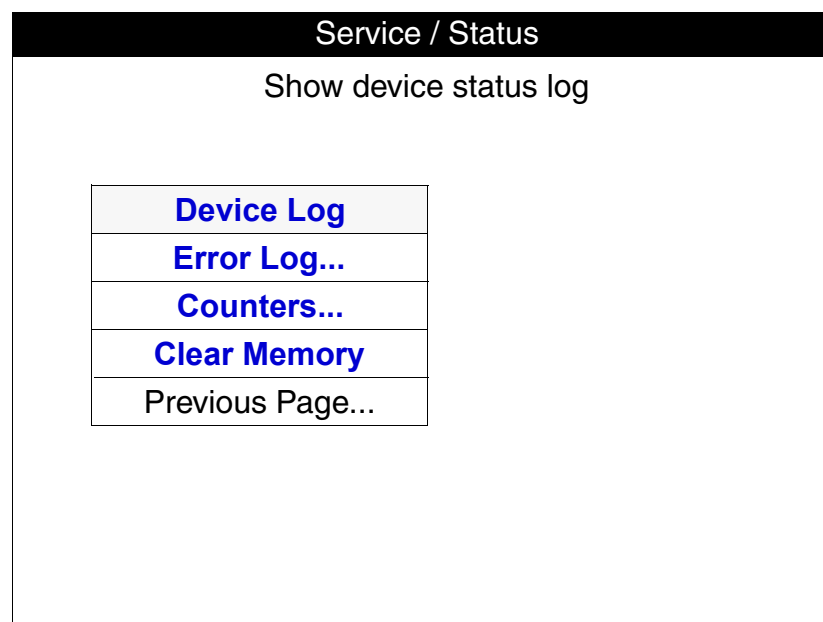


2. Enter the passcode **5433** by rotating the SELECTOR to select a digit, and then press the SELECTOR to continue. After the last digit is entered, the SETUP menu appears.

Using the Service/Status Features *(continued)*

Displaying the SERVICE/STATUS Submenu *(continued)*

3. Rotate the SELECTOR to choose SERVICE on the SETUP menu, and then press the SELECTOR. At the service passcode prompt, enter the passcode **5433**. The SERVICE menu appears.
4. Rotate the SELECTOR to choose STATUS, and then press the SELECTOR to display the SERVICE/STATUS submenu.
5. Select the desired topic from the SERVICE/STATUS submenu.



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** submenu, and then select 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
for monophasic only	
Press Selector knob to exit	

(Continued on next page)

Device Log *(continued)*

Device Log Entries

Each item 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. See [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 (see [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 Messages** – Records YES or NO to whether there are any error codes stored in the Error Log. (See [Processing Error Codes](#).)

(Continued on next page)

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 Defibrillator 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 **A15 Energy Storage Capacitor**.

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, a specific four-digit hexadecimal number is written into the device Error Log (for example, 500e), and then the front panel SERVICE indicator illuminates. The illuminated SERVICE indicator is your signal to examine the Error Log and process any reported errors.

Displaying the Error Log

◆ To display the Error Log:

1. Display the **SERVICE/STATUS** menu, and then select ERROR LOG.
2. Proceed or return to **Processing Error Codes**.

Clearing the Error Log

◆ To clear the Error Log:

1. Display the **SERVICE/STATUS** menu, and then select ERROR LOG.
2. Select CLEAR LOG from the SERVICE/STATUS/ERROR LOG submenu.
3. Turn the device OFF or navigate to other service topics, as required.

Error Log *(continued)*

How Error Codes are Recorded in the Error Log

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

Service / Status / Error Log			
Go back to previous page.			
08/18/99	10:21:05	4005	0000d408
08/18/99	10:21:05	500e	00001c64
08/18/99	10:21:05	5013	af3d2124

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.

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** submenu, and then select COUNTERS.

The screenshot shows a menu titled "Service / Status / Counters" with a "Go back to previous page." option at the top. Below this is a table of shock counts. The "Total Shocks" row shows a lifetime count of 7445. The subsequent rows show counts for different energy levels: 360J (707), 225 – 325J (1215), and 0 – 200J (466). At the bottom, there are two buttons: "Clear All" and "Previous Page...".

Service / Status / Counters		
Go back to previous page.		
Total Shocks		7445
360J	707	2325
225 – 325J	1215	3399
0 – 200J	466	1721
Clear All Previous Page...		

lifetime counts
(cannot be reset)

counts since last reset
reset counters in boxes

Counters *(continued)*

Understanding the Counters

The SERVICE/STATUS/COUNTERS overlay displays 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 number in the box represents the number of 360-joule shocks delivered since the last reset. The number in the right column is a running total of all 360-joules shocks ever delivered by the device (cannot be reset).
- **225 – 325J Shocks** – The number in the box represents the number of 225- to 325-joule shocks delivered since the last reset. The number in the right column is a running total of all 225- to 325-joule shocks ever delivered by the device (cannot be reset).
- **0 – 200J Shocks** – The number in the box represents the number of 0- to 200-joule shocks delivered since the last reset. The number in the right column is a running total of all 0- to 200-joule shocks ever delivered by the device (cannot be reset).

Resetting the Counters

With the SERVICE/STATUS/COUNTERS overlay displayed, rotate the SELECTOR to choose CLEAR ALL, and then press the SELECTOR. This resets the subtotal counters in the boxes, but not the running-total counters. You can also reset the counters using the [Clear Memory](#) feature.

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 previous patient data is no longer required. You also clear the data management memory as part of certain 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 (see “Data Management” in the operating instructions).

Clearing the Data Management Memory

- ◆ To clear the data management memory (this is permanent; there is no undo):
 1. Display the **SERVICE/STATUS** submenu.
 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

When an internal program or process fails to execute properly, an error code is logged and the **SERVICE INDICATOR** illuminates. Errors rarely occur and should be investigated thoroughly by a qualified service technician before the device is placed back into active use. Always complete the Performance Inspection Procedures (PIP) after encountering and clearing any error code(s).

Error codes stored in the Error 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 the error code(s)**, and then shut down and restart the device. If the error code does not recur, it may have been the result of EMI or ESD.

(Continued on next page)

Processing Error Codes *(continued)*

Processing a Specific Error Code

- ◆ To process an error code:
 1. Review error codes by displaying the **Error Log**. Record any errors, including the date, time, error, and error extension.
 2. Using the SELECTOR, choose CLEAR LOG, and then turn the device OFF.
 3. Complete the Performance Inspection Procedure (PIP). If it completes successfully, continue with step 4. If the SERVICE indicator illuminates at any time during the PIP, stop the PIP and skip to step 5.
 4. After 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 with 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 Physio-Control service or sales representative.

Error Code Categories

Error codes are organized into the following categories, in four-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
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
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 self-test 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 three tries. May also be caused by the serial channel not responding.)	1
000d	UT_ERROR_ADC_CAL_NOT_COMPLETE (ADC busy bit not clear 150 ms 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; 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 lines for new oldest record; disables flash.)	31, 2
3006	DM_ERROR_DATABASE_ERASE_FAILED (Erase block failed; disables flash; param = block requested.)	31, 2
3007	DM_ERROR_DATABASE_ERASE_VERIFY (Verification of erased block failed; disabled flash; param = block.)	31, 2
3008	DM_ERROR_DATABASE_FLASH_ERASE (Erase database failed; disables flash; param = 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, System Monitor Error Codes (SM):

Error	Error Description	Corrective Action Code
4009	SM_ERROR_RAM_FAILURE (RAM failure during self-test. 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 = high 16 bits expected CRC, low 16 bits include computed CRC.)	4, 6, 1
400b	SM_ERROR_CRC_FAILURE (Program contents failed CRC test; value = high 16 bits expected CRC, low 16 bits include computed CRC.)	4, 6, 1
400c	SM_ERROR_VOLTAGE_LOW (ADC voltage reading low. HW voltage low; status code = high 8 bits contains ADC value, low 8 bits contains channel #.)	4, 6, 1
400d	SM_ERROR_VOLTAGE_HIGH (ADC voltage reading high. HW voltage high; status code = high 8 bits contains ADC value, low 8 bits contains channel #.)	4, 6, 1
4010	SM_ERROR_SERVICE_LED (Service LED failure. LED expected to be on, but 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.)	28
4013	SM_ERROR_FONT_VOICE_CRC (Invalid CRC in font/voice flash. Font/voice CRC error; status code = top 16 bits are stored CRC, low 16 bits are computed CRC.)	28

Processor Control Error Code Table

Initial Digit 5, Processor Control 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 = seconds since last set. Low 16 bits = watchdog 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, unknown 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

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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
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 pre-return 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

(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
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

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 (Failure to communicate with the SpO2 module after 5 seconds. SpO2 HW detection error param: 0 = SpO2 missing; 1 = SpO2 present but not MFG configured.)	28, 33, 12, 1
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.)	8, 12, 1
900f	PPSP_ERROR_RAW_IOCTL_FAILED (ioctl() call failed. SW Options set failure; status = ioctl return code.)	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 self-test; 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 up. NIBP module reset detected outside first 10 seconds 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 = SW version.)	8 , 34 , 22

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.)	36, 28, 35, 23
9205	PPCO_ERROR_WRITING_TO_MODULE (CO2 module detected but not in manufacturing configuration. Unit disabled. Param = config-info.)	8, 35, 23
9206	Refer to the following service sub-codes:	
9206 0001	PPCO_ERROR_CONFIG (Check Calibration - Incorrect calibration process, wrong test gas concentration level or defective module)	35, 23
9206 0002	PPCO_ERROR_CONFIG (Check Flow - something is blocking flow through the CO2 system, or pump is not operational)	37, 23
9206 0003	PPCO_ERROR_CONFIG (Occlusion in gas input line - blockage in input tubing, upstream from the CO2 Module Pump)	37, 23
9206 0010	PPCO_ERROR_CONFIG (Defect on CO2 Module, sub-part EEPROM or pressure sensor)	23
9206 0011	PPCO_ERROR_CONFIG (CO2 Module temperature out of range, <-4C or >80C. Or defective CO2 Module)	23
9206 0012	PPCO_ERROR_CONFIG (Replacement of CO2 Scrubber & Pump required. Replace CO2 Module. Module exceeded 20K hours of operational time.)	23
9206 0013	PPCO_ERROR_CONFIG (Defect on CO2 Module, sub-part CO2 IR Detector)	23
9206 0014	PPCO_ERROR_CONFIG (Defect on CO2 Module, sub-part - 15 volt supply out of range)	23
	PPCO_ERROR_CONFIG (CO2 module service code. Param top 16 bits = serviceCodeTime, low 16 bits = serviceCode.)	
9208	PPCO_ERROR_PARITY_IOCTL_FAILED (CO2 calibration failure, AZ failure 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.)	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 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 selected; 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: high-16 = pacer selected range, low-16 = pacer actual rate.)	10
a011	TH_ERROR_PA_CURRENT_OUT_OF_RANGE (Pacing current out of tolerance; param: high-16 = selected current, low-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

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 disabled; 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 transfer-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: high-16 = rate selected, low-16 = actual rate.)	15
a028	TH_ERROR_CAL_ENERGY_FAIL (Calibrated voltage is out of range; param: high-16 = table index, low-16 = voltage count.)	6, 1
a029	TH_ERROR_BTE_FAIL (Error condition with BTE board; param: high-16 bits = fault type, low-16 bits = cedar state.)	17, 1
a02b	TH_ERROR_DEFIB_CONFIG (Conflicting defib type. Cold boot if test bit set; otherwise, disable biphasic; param = test-bit setting.)	28
a02c	TH_ERROR_DUMP_LINE_FAIL (One of dump lines failed; param = test ID.)	19
a02d	TH_ERROR_WRONG_DEFIB_TYPE (Device is Monophasic w/106 or later S/W; the installed software is to be loaded in Biphasic devices only)	28
a02e	TH_ERROR_ADC_READ (ADC read failure when getting cap charge.)	28

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 did not 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.)	11, 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 high-pot test.)	10
a112	DE_ERROR_TEST_XFER_ENABLE (Problem with transfer; 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

(Continued on next page)

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 through 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

(Continued on next page)

Therapy Error Code Table *(continued)***Initial Character a, Defib. Error Codes (DE) *(continued)* and Pacer Error Codes (PA):**

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 received overrun, framing or parity. Unit used near high EMI causing these issues.)	15
a204	PA_ERROR_2MS_OVERRUN (2 ms ECG sampling overrun.)	15
a208	PA_ERROR_MSG_RESYNC (Received message incomplete.)	15
a209	PA_ERROR_MSG_SIZE (Received 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 occurred.)	15
a215	PA_ERROR_STACK_CHECK (Isolated +5 V ref. out of range.)	15
a216	PA_ERROR_V_ISO_MON (HV present when not pacing.)	15
a217	PA_ERROR_V_12V_MON (+12 V voltage out of range.)	15

(Continued on next page)

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 (External 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 (Printhead 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 (Printhead 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.)	28, 13
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 (Versions Earlier Than -099)

If an error code from this list appears in the ERROR LOG, upgrade the software to version 3011371-099 or later. No other action or 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

(Continued on next page)

Obsolete Error Codes (Versions Earlier Than -099)

(continued)

Code	Description	Corrective Action
Initial Digit 1, User Interface Diagnostic Codes (UI) (continued):		
1018	UI_ERROR_INVALID_SEQUENCE_COUNT	28
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

Obsolete Error Codes (Versions Earlier Than -099)

(continued)

Code	Description	Corrective Action
Initial Digit 1, User Interface Diagnostic Codes (UI) (continued):		
1029	UI_ERROR_INVALID_PP_STATUS	28
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

(Continued on next page)

Obsolete Error Codes (Versions Earlier Than -099)

(continued)

Code	Description	Corrective Action
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
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

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Obsolete Error Codes (Versions Earlier Than -099)

(continued)

Code	Description	Corrective Action
Initial Digit 2, Data Communications Diagnostic Codes (DC) <i>(continued)</i>:		
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
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

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Obsolete Error Codes (Versions Earlier Than -099)

(continued)

Code	Description	Corrective Action
Initial Digit 3, Data Management Diagnostic Codes (DM) <i>(continued)</i>:		
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
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

Obsolete Error Codes (Versions Earlier Than -099)

(continued)

Code	Description	Corrective Action
Initial Digit 3, Data Management Diagnostic Codes (DM) <i>(continued)</i>:		
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
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

Obsolete Error Codes (Versions Earlier Than -099)

(continued)

Code	Description	Corrective Action
Initial Digit 3, Data Management Diagnostic Codes (DM) <i>(continued)</i>:		
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
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

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Obsolete Error Codes (Versions Earlier Than -099)

(continued)

Code	Description	Corrective Action
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
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

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Obsolete Error Codes (Versions Earlier Than -099)

(continued)

Code	Description	Corrective Action
Initial Digit 5, Processor Control Diagnostic Codes (PC) <i>(continued)</i>:		
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
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

Obsolete Error Codes (Versions Earlier Than -099)

(continued)

Code	Description	Corrective Action
Initial Digit 5, Processor Control Diagnostic Codes (PC) (continued):		
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
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

Obsolete Error Codes (Versions Earlier Than -099)

(continued)

Code	Description	Corrective Action
Initial Digit 6, ECG Diagnostic Codes (ECG) <i>(continued)</i>:		
6009	ECG_ERROR_CREATE_WATCHDOG	28
600a	ECG_ERROR_SEMAPHORE_CREATE	28
600b	ECG_ERROR_CMD_QUEUE_FULL	28
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

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Obsolete Error Codes (Versions Earlier Than -099)

(continued)

Code	Description	Corrective Action
Initial Digit 7, SAS Diagnostic Codes (SAS) <i>(continued)</i>:		
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
Initial Digit 8, 12-Lead ECG Error Codes (L12):		
8001	L12_ERROR_UNKNOWN	28
8002	L12_ERROR_ANALYSIS_SEMAPHORE	28
8003	L12_ERROR_STATE_SEMAPHORE	28
8004	L12_ERROR_QUEUEING_COMMANDS	28
8005	L12_ERROR_CREATING_QUEUE	28
8006	L12_ERROR_UNKNOWN_START	28
8007	L12_ERROR_UNKNOWN_COMMAND	28
8008	L12_ERROR_BAD_STATE	28
8009	L12_ERROR_FALLING_BEHIND	28

Obsolete Error Codes (Versions Earlier Than -099)

(continued)

Code	Description	Corrective Action
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
9105	PPNI_ERROR_WRITING_TO_MODULE	28
9106	PPNI_ERROR_CONFIG	28

(Continued on next page)

Obsolete Error Codes (Versions Earlier Than -099)

(continued)

Code	Description	Corrective Action
Initial Digit 9, Patient Parameters Diagnostic Codes (PP) (continued):		
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
920d	PPCO_ERROR_WRITE_FAILED	28
920e	PPCO_ERROR_SELECT_FAILED	28
920f	PPCO_ERROR_WRONG_LENGTH_WRITTEN	28

(Continued on next page)

Obsolete Error Codes (Versions Earlier Than -099)

(continued)

Code	Description	Corrective Action
Initial Character a, Therapy Diagnostic Codes (TH, DE or PA):		
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
a017	TH_ERROR_DEFIB (Obsolete error codes.) a017 extension codes 00000001- 00000033 remapped to error codes a101 through a133.)	28
a018	TH_ERROR_PACER (Obsolete error codes.) a018 extension codes 00000001- 0000001e remapped to error codes a201 through a224.)	28
a019	TH_ERROR_XFER_HOLD_TEST	28
a01c	TH_ERROR_UNKWN_ADC_READ_REQUEST	28
a01d	TH_ERROR_UNKWN_DEFIB_STATE	28

(Continued on next page)

Obsolete Error Codes (Versions Earlier Than -099)

(continued)

Code	Description	Corrective Action
Initial Character a, Therapy Diagnostic Codes (TH, DE or PA) (continued):		
a01e	TH_ERROR_UNKWN_ERR_ACTION	28
a01f	TH_ERROR_UNKWN_TEST_RESULT	28
a025	TH_ERROR_CORRUPT_PACER_STAT	28
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

(Continued on next page)

Obsolete Error Codes (Versions Earlier Than -099)

(continued)

Code	Description	Corrective Action
Initial Character a, Therapy Diagnostic Codes (TH, DE or PA) (continued):		
a20a	PA_ERROR_SEQUENCING	28
a20b	PA_ERROR_UNKNOWN_RATE	28
a20c	PA_ERROR_UNKNOWN_CURRENT	28
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
be01	PRFAX_ERROR_ACCESS_RING_BUFFER	28
be00	PRFAX_ERROR_RING_BUFFER_CREATE	28
be02	PRFAX_ERROR_4DEBUG	28

(Continued on next page)

Obsolete Error Codes (Versions Earlier Than -099)

(continued)

Code	Description	Corrective Action
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
Initial Character d, Serial Communications Diagnostic Codes (SC):		
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

(Continued on next page)

Obsolete Error Codes (Versions Earlier Than -099)

(continued)

Code	Description	Corrective Action Code
Initial Character d, Serial Communications Diagnostic Codes (SC) <i>(continued)</i>:		
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 Tables](#). 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 .

(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).
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.

(Continued on next page)

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: <ol style="list-style-type: none"> Complete the TCP – Defibrillator Calibration procedure, and then conduct PIP. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary. Replace A04 Therapy PCB or A22 Biphasic PCB /A14 Inductive Resistor.
11	Keypad Error: <ol style="list-style-type: none"> Possible transient from input power (clear error, conduct PIP). Replace indicated A09 Small Keypad or A10 Large Keypad. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary.

(Continued on next page)

Corrective Action Codes *(continued)*

Corrective Action Code	Description
12	<p>SpO2 Error:</p> <ol style="list-style-type: none"> Possible transient from input power (clear error, conduct PIP). Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary. Replace A16 SpO2 Module. Replace A06 OEM PCB.
13	<p>Printer Error:</p> <ol style="list-style-type: none"> Possible transient from input power (clear error, conduct PIP). Incorrect A12 Printer Assembly is installed (for example, the device does not recognize the 100 mm printer). Replace A12 Printer Assembly. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary.
14	<p>Defibrillation Capacitor Error:</p> <ol style="list-style-type: none"> Possible transient from input power (clear error, conduct PIP). Replace A15 Energy Storage Capacitor.

(Continued on next page)

Corrective Action Codes *(continued)*

Corrective Action Code	Description
15	Pacer out of calibration: <ol style="list-style-type: none">Complete the TCP – Pacer Self-Calibration procedure, and then conduct PIP.Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary.Replace A04 Therapy PCB.
16	Pacer output circuit damaged: <ol style="list-style-type: none">Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary.Replace A04 Therapy PCB.
17	BTE fault or unknown energy: <ol style="list-style-type: none">Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary.Replace A22 Biphasic PCB or A04 Therapy PCB.

(Continued on next page)

Corrective Action Codes *(continued)*

Corrective Action Code	Description
18	Defibrillator configuration error: a. Replace A04 Therapy PCB or A22 Biphasic PCB or 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 A22 Biphasic PCB or 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 A02 Memory PCB .
22	NIBP system error: <ul style="list-style-type: none">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.

Corrective Action Codes *(continued)*

Corrective Action Code	Description
23	CO2 system error: <ul style="list-style-type: none">a. Possible transient from input power, or module has operated outside specified temperature (clear error, conduct PIP).b. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary.c. Replace A23 CO2 Module.d. Replace A06 OEM PCB.e. Replace A01 System PCB.
24	<ul style="list-style-type: none">a. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary.b. Replace A01 System PCB, and install the current device software version.
25	<ul style="list-style-type: none">a. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary.b. Replace A22 Biphasic PCB.

(Continued on next page)

Corrective Action Codes *(continued)*

Corrective Action Code	Description
26	Therapy hardware/software mismatch: a. Check the software version of your defibrillator/monitor. Press ON to turn device power off, and then press ON 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 .
27	a. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary. b. Replace A04 Therapy PCB .
28	The current device software version is recommended, contact Physio-Control Field Service .

(Continued on next page)

Corrective Action Codes *(continued)*

Corrective Action Code	Description
29	Possible transient from input power: <ol style="list-style-type: none"> Turn off the device. Disconnect the defibrillator/monitor from line power. Investigate power system grounding. Call Physio-Control Technical Support.
30	Possible therapy processor reset condition. If operating the LIFEPAK 12 defibrillator/monitor with an external power adapter, wait 2 seconds after disconnecting from line power before turning the defibrillator/monitor on.
31	Clear Data Management memory.
32	Replace modem PC Card.
33	<ol style="list-style-type: none"> Possible transient from input power (clear error, conduct PIP). Replace SpO2 sensor. Check SpO2 connector for integrity. Verify that the appropriate connecting cables and wire harnesses are functional; replace if necessary.

(Continued on next page)

Corrective Action Codes *(continued)*

Corrective Action Code	Description
34	Check NIBP calibration.
35	<ol style="list-style-type: none">Perform CO2 calibration.Recalibrate with FilterLine connected.Check FRS connector, re-seat or check for broken wire.
36	Incorrect type of device used for configuration clone process.
37	CO2 flow issue: <ol style="list-style-type: none">Resolve tube pinch or kink; ensure inlet and exhaust tubing are routed properly.Replace FilterLine.Check for strong magnetic field in close proximity to the device.

Service Indicator

What the SERVICE Indicator Does

The SERVICE indicator illuminates when an error code is written to the Error Code Log. Always examine such instances using the instructions in [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 illuminates 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 illuminate, 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.

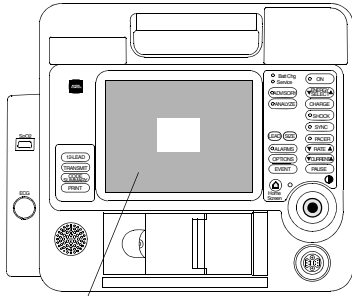
Device User Test

When you turn on the LIFEPAK 12 defibrillator/monitor, a series of self-tests occur. If errors are detected, the **SERVICE INDICATOR** illuminates. Self-testing does not occur only when the device is turned ON; 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 generates 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 illuminates and an error is written to the **Error Code Log**.

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


Contrast Test – LCD Only



contrast display

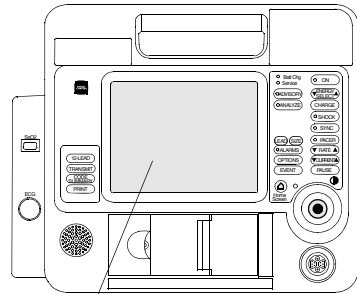
◆ To test screen contrast:

1. Display the **SERVICE** menu.
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, and 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 button , rotate the SELECTOR to the desired display, and then press the SELECTOR.

5. Turn the device OFF, or navigate to other service options, as required.

Pixels Test



pixels display

◆ To test the display pixels:

1. Display the **SERVICE** menu.
2. Using the SELECTOR, navigate to SERVICE/TESTS/PIXELS. The display changes to display a uniformly lit screen of medium contrast.
3. Carefully examine the screen for any anomalies. After five seconds, the message PRESS SELECTOR KNOB TO EXIT appears.
4. Press the SELECTOR. The SERVICE/TESTS overlay appears.
5. Turn the device OFF or navigate to other service options, as required.

Modem PC Card Test

Introduction

This test checks the ability of the internal modem PC Card to communicate with a remote landline modem. To perform this test, you need a telephone number that is answered either by a data modem or 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 test assumes you are using the suggested [modem PC Card](#), MIN 3010294. If you use any other modem card, you must determine the correct AT Command initialization strings.

Continue with the test setup on the next page.

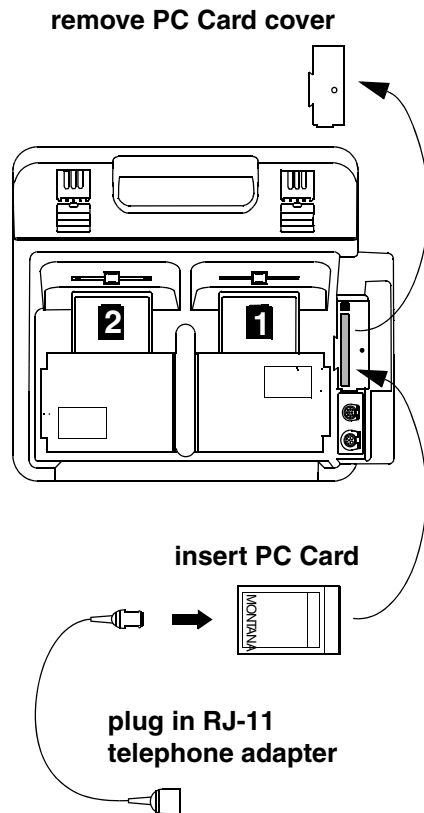
(Continued on next page)

Modem PC Card Test *(continued)*

Installation and Setup

◆ To install the modem PC Card and RJ-11 telephone adapter:

1. With the device disconnected from power, remove the Phillips-head screw securing the modem 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 RJ-11 telephone cable through the modem PC Card cover and snap it into the x-jack RJ-11 connector.

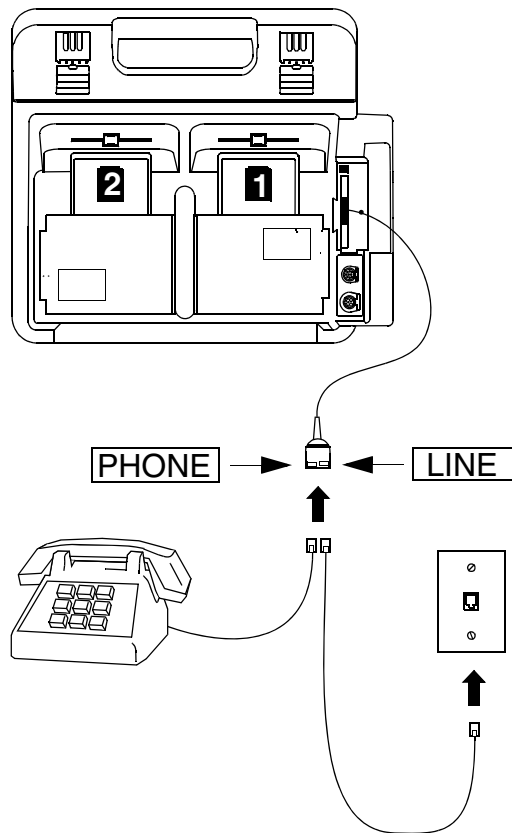


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Modem PC Card Test *(continued)*

Page 3 of 5

Installation and Setup *(continued)*



◆ To connect the device/modem 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 forth, will not work.

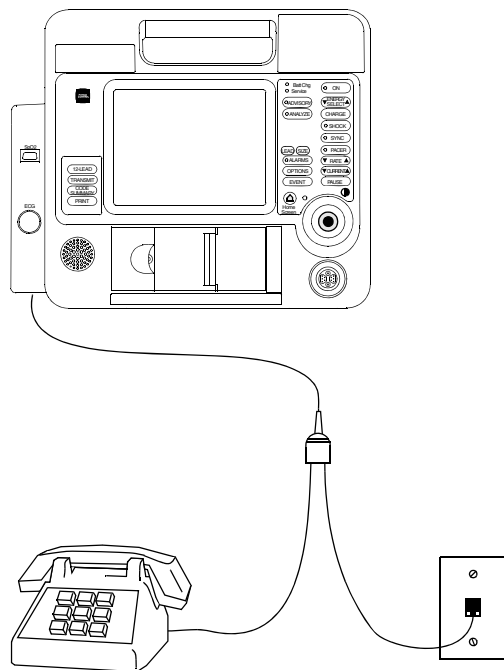
1. Unplug the telephone and reconnect it to the RJ-11 telephone adapter jack labeled PHONE.
2. Connect one end of a standard telephone cable to the RJ-11 telephone adapter x-jack and the other end to the telephone outlet.

Continue with the communication test on the next page.

(Continued on next page)

Modem PC Card Test *(continued)*

Communication Verification



◆ To communicate between the device and a remote data modem or Fax modem (if installed):

1. Display the **SETUP** menu and select TRANSMISSION.

To communicate with a data modem, select DATA on the TRANSMISSION overlay. To communicate with a Fax modem, select FAX on the TRANSMISSION overlay.

Note: Only devices with the Fax option installed will display the TRANSMISSION overlay.

2. Select PORTS on the TRANSMISSION/DATA menu.
3. Select INTERNAL.
4. Select EDIT STRING 1.
5. Ensure that the string fields are blank.
6. Press HOME SCREEN to return to the main SETUP menu.
7. Select TRANSMISSION in the SETUP menu.
8. Select DATA (for a data modem) or FAX (for a Fax modem).

Note: Only devices with the Fax option installed will display the TRANSMISSION overlay.

(Continued on next page)

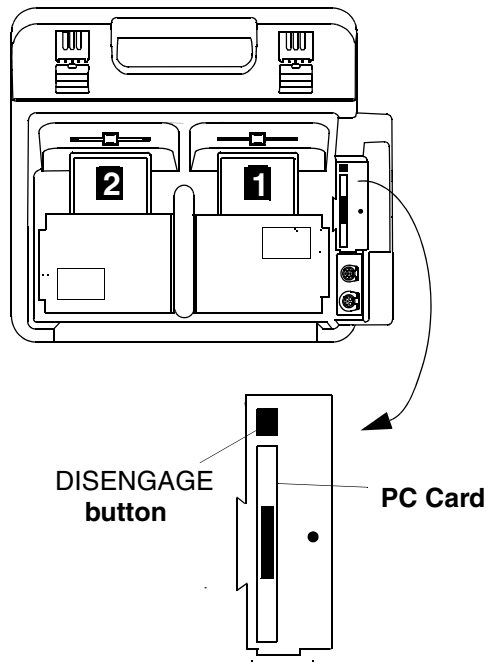
Modem PC Card Test *(continued)*

Communication Verification *(continued)*

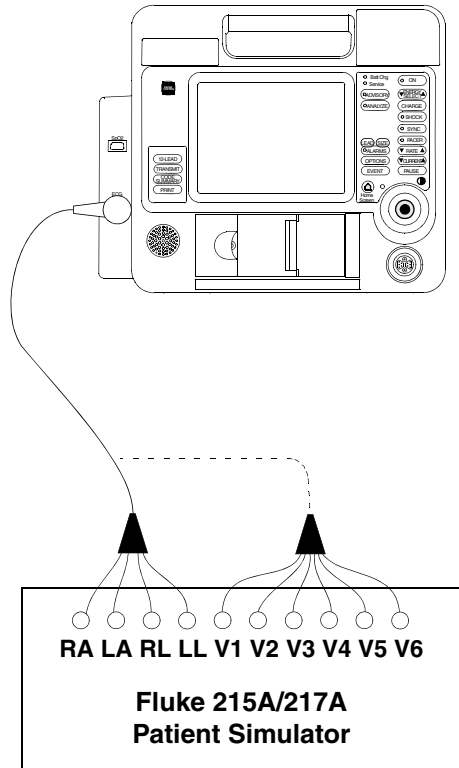
9. Select SITES, and then select SITE 10 (or any unconfigured site).
10. Enter the PHONE # for the remote modem.
For example, to dial the telephone number 1 (425) 867-4861, enter 9 and P (pause two seconds), and then enter 14258674861. Do not use PREFIX 1 or PREFIX 2.
11. Select OUTPUT PORT.
12. Select INTERNAL (for a data modem) or INTERNAL FAX (for a Fax modem).
13. Select MORE and then select TEST. The AT Command text appears and, after connection, the text +++ (hang up) appears. This indicates a successful test.

◆ To remove the modem PC Card from the device:

1. Turn the device OFF.
2. Disconnect the RJ-11 telephone cable from the modem PC Card.
3. Push the DISENGAGE button above the PC Card slot to push the card free of the connector. Remove the PC Card.
4. Reinstall the modem PC Card cover onto the device.



12-Lead/3-Lead ECG Fast Restore Test

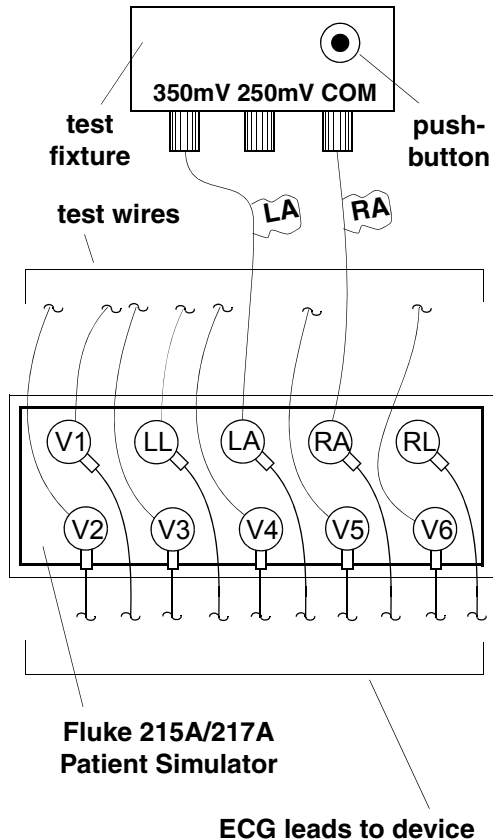


◆ To test 12-lead/3-lead ECG fast restore:

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 then connect their corresponding leads to the patient simulator terminals.
3. Fashion the **fast restore test fixture** for this test.
4. Turn the patient simulator OFF (no power is applied to the simulator for this test).
5. Insert 12-inch, tinned, test wires under terminal posts LA, RA, LL, and V1 to V6 (see illustration on next page).
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 ECG waveform area (top of the screen), 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 HOME SCREEN.

(Continued on next page)

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

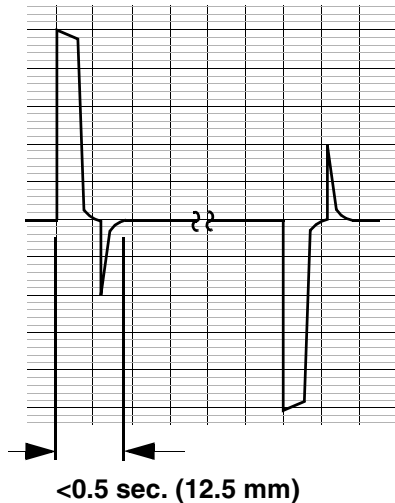


9. Press OPTIONS and select PRINTER.
10. Select DIAGNOSTIC for the mode.
11. Press HOME SCREEN.
12. Press PRINT. A printout of ECG Lead I appears (flat line).
13. Press the test fixture pushbutton for five seconds, and then release it. The dc step functions appear on the screen and on the printout. Press PRINT to stop printing.
14. 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.
15. Move the test wire LA to the test fixture 250 mV terminal.
16. Rotate the SELECTOR to highlight the channel 1 ECG waveform area.
17. Using the SELECTOR, select II for the LEAD, and then press PRINT.
18. Press the test fixture pushbutton for 5 seconds, and then release it. The dc step functions appear on the printout. Press PRINT to stop printing.
19. Confirm that the fast restore time is 0.5 seconds (12.5 mm) or less (see illustration on next page).

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

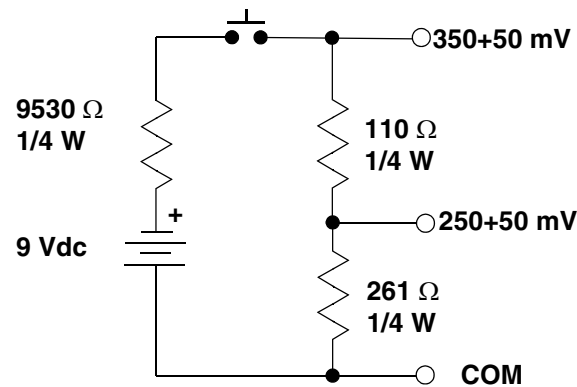
Page 3 of 3



20. 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.
21. Rotate the SELECTOR to highlight Channel 1 (top of screen).
22. Using the SELECTOR, select V1 for the LEAD, and then press PRINT.
23. 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.
24. Repeat steps 20 through 23 for leads V2, V3, V4, V5, and V6.
25. Disconnect the test wires from the patient simulator and the ECG cable from the device.
26. Turn the device OFF.

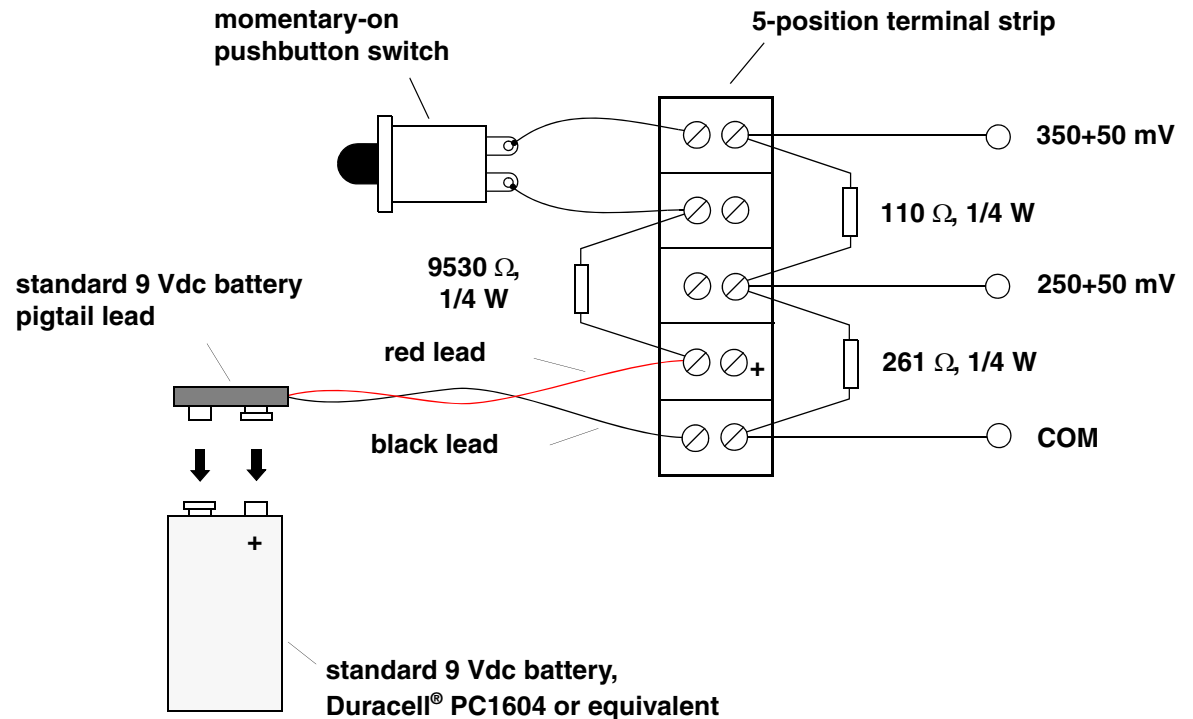
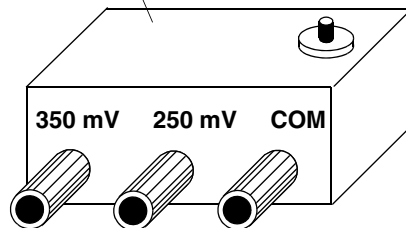
Fast Restore Test Fixture

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 device helps prevent and detect possible electrical and mechanical problems. When scheduled maintenance is due, a MAINTENANCE DUE message displays for 10 minutes each time the device is turned on (see [Setting/Resetting the Maintenance Prompt Interval](#)).

For information about battery charging, conditioning, and battery-related topics, see [Battery Maintenance](#). The information in this section includes the following:

[Setting/Resetting the Maintenance Prompt Interval](#)

[Preventive Maintenance and Testing Schedule](#)

[Scheduled Replacement Items](#)

[Device Useful Life](#)

[Support Policy](#)

[Cleaning](#)

[Storage](#)

[A12 Printer \(50 mm\) Maintenance](#)

[A12 Printer \(100 mm\) Maintenance](#)

Setting/Resetting the Maintenance Prompt Interval

You can set up the device to display the MAINTENANCE DUE message at a selected interval (for example, 6 months). When this time interval is reached, the message appears continuously for 10 minutes each time the device is turned on.

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

◆ To change the scheduled maintenance interval:

1. Display the **SERVICE** menu.
2. Select MAINT PROMPT to display the SERVICE/MAINT PROMPT submenu, which shows the NEXT PROMPT date for scheduled maintenance.
3. Select INTERVAL.
4. Select the desired interval (OFF, 3 MONTHS, 6 MONTHS, or 12 MONTHS). The factory default setting is 12 months.

◆ To clear the MAINTENANCE DUE message after scheduled maintenance is completed:

1. Select RESET on the SERVICE/MAINT PROMPT submenu. The NEXT PROMPT date is revised to the new scheduled maintenance date.
2. Turn the device OFF.

Preventive Maintenance and Testing Schedule

Introduction

Periodic maintenance, inspection, and testing of the device will help prevent possible electrical and mechanical problems. For additional items, see the Operator's Checklist in the operating instructions.

Guidelines

The following table shows the schedule for preventive maintenance activities. For items that should be replaced at regular intervals, see [Scheduled Replacement Items](#).

Activity	Daily	As Needed	12 Months
Performance Inspection Procedures (PIP)		•	•
Test and Calibration Procedures (TCP)		•	
Exterior Physical Inspection	•		•
Exterior Cleaning		•	•
Interior Cleaning		•	

Scheduled Replacement Items

The following items should be replaced at regular intervals because of their finite life span:

- **Battery pins** — Replace to ensure the batteries continue to make good connection with the device.
- **ECG cable (3-lead/12-lead)** — Replace to ensure the continued performance of this cable.
- **Therapy cable** — Replace to ensure the continued performance of this cable.
- **Coin battery** — Replace to ensure 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.

Note: Contact your Physio-Control Service Representative for assistance when coin battery replacement is required.

(Continued on next page)

Scheduled Replacement Items *(continued)*

The following table shows the schedule for replacement items.

Replacement Item	Frequency
Replace battery pins	2 years
Replace ECG cable	2 years
Replace Therapy cable	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 to 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 five-year useful life expectancy for defibrillators (*Estimated Useful Lives of Depreciable Hospital Assets, Revised 1993 Edition*). Similarly, the US Army lists an eight-year life expectancy for defibrillators (technical bulletin: *Maintenance Expenditure Limits for Medical Materiel, TB MED 7 Revision 8 October 1993*).

Support Policy

Physio-Control provides full technical support and replacement parts for a period of 8 years from the date of shipment from our manufacturing facility. After this 8-year period, Physio-Control provides technical support and replacement parts on an as-available basis.

Cleaning

Tools and Materials

The tools and materials needed to perform an external and internal cleaning of the LIFEPAK 12 defibrillator/monitor are listed 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)*

Exterior Cleaning Procedure

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 the accessory operating instructions.

Clean the exterior of the device 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)*

Interior Cleaning Procedure

WARNING!

Shock hazard. The Energy Storage Capacitor carries high voltage. Remove the battery and discharge the capacitor before handling.

CAUTION!

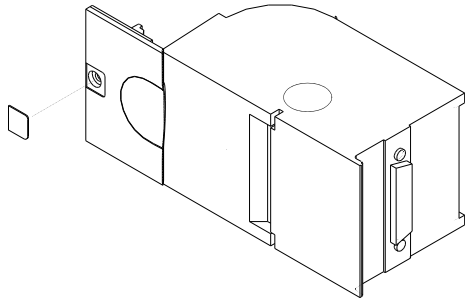
Possible case damage. Do not clean any part of this device or accessories with bleach, bleach dilution, or phenolic compounds. Do not use abrasive or flammable cleaning agents. Do not attempt to sterilize this device or any accessories unless otherwise specified in the accessory operating instructions.

- ◆ To clean the interior of the device.
 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 device is not in use, store at temperatures between 0° and +35° C (+32° and +95° F) if batteries are installed, or between -20° and +60° C (-4° and +140° F) if no batteries are installed.

A12 Printer (50 mm) Maintenance



A12 Printer (50 mm)

Printroller Cleaning

This section provides general maintenance information for the A12 Printer (50 mm). For the 100-mm printer, see [A12 Printer \(100 mm\) Maintenance](#).

See 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.

Printhead Cleaning

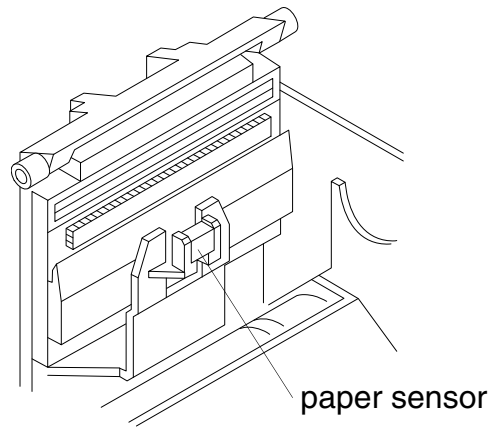
To remove paper debris and other residue from the print roller, soak a cotton swab with alcohol and wipe across the roller surface.

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 the device OFF. 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.

A12 Printer (50 mm) Maintenance *(continued)*

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.

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). (See the [A12 Printer \(50 mm\) Assembly Replacement](#) procedure.)
2. Install a roll of printer paper in the printer.
3. Turn the LIFEPAK 12 defibrillator/monitor ON and conduct the TCP – Printer Calibration procedure.

(Continued on next page)

A12 Printer (50 mm) Maintenance *(continued)*

Printhead Adjustment Procedure *(continued)*

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 the SELECTER and skip to step 9. If the printout is not satisfactory, continue with step 5 to adjust the printhead.
5. Turn the device OFF.
6. Remove the printer from the device.
7. Open the printer door and locate the pivot screw on the bottom rear surface.
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 the device OFF and reinstall the printer.

A12 Printer (100 mm) Maintenance

For general cleaning information on the 50-mm printer, see [A12 Printer \(50 mm\) Maintenance](#).

See the [A12 Printer \(100 mm\) Parts List](#) for MIN 3006229-004 or earlier to locate parts available for replacement. No replacement parts are available for printers MIN 3006229-005 and later.

Note: Printhead adjustment is not necessary and does not apply to the 100-mm printer.

Battery Maintenance

Follow the guidelines described in this section to help maximize battery life and performance.

Battery General Characteristics

Battery Performance Characteristics

Charging Batteries

Conditioning Batteries

Testing Battery Shelf-Life

Discarding/Recycling Batteries

Storing Batteries

Receiving New Batteries

Coin Battery

For information about the Battery Support System 2, see “Basic Orientation” in the *Battery Support System 2 Operating Instructions*.

For information about the Mobile Battery Service Station (manufactured by AD Elektronik GmbH), see the Mobile Battery Service Station user’s manual.

Note: Unless otherwise specified, the information in this section applies only to battery maintenance using the Battery Support System 2 (MIN 3010035) or Mobile Battery Service Station (MIN 3202539).

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 can 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.



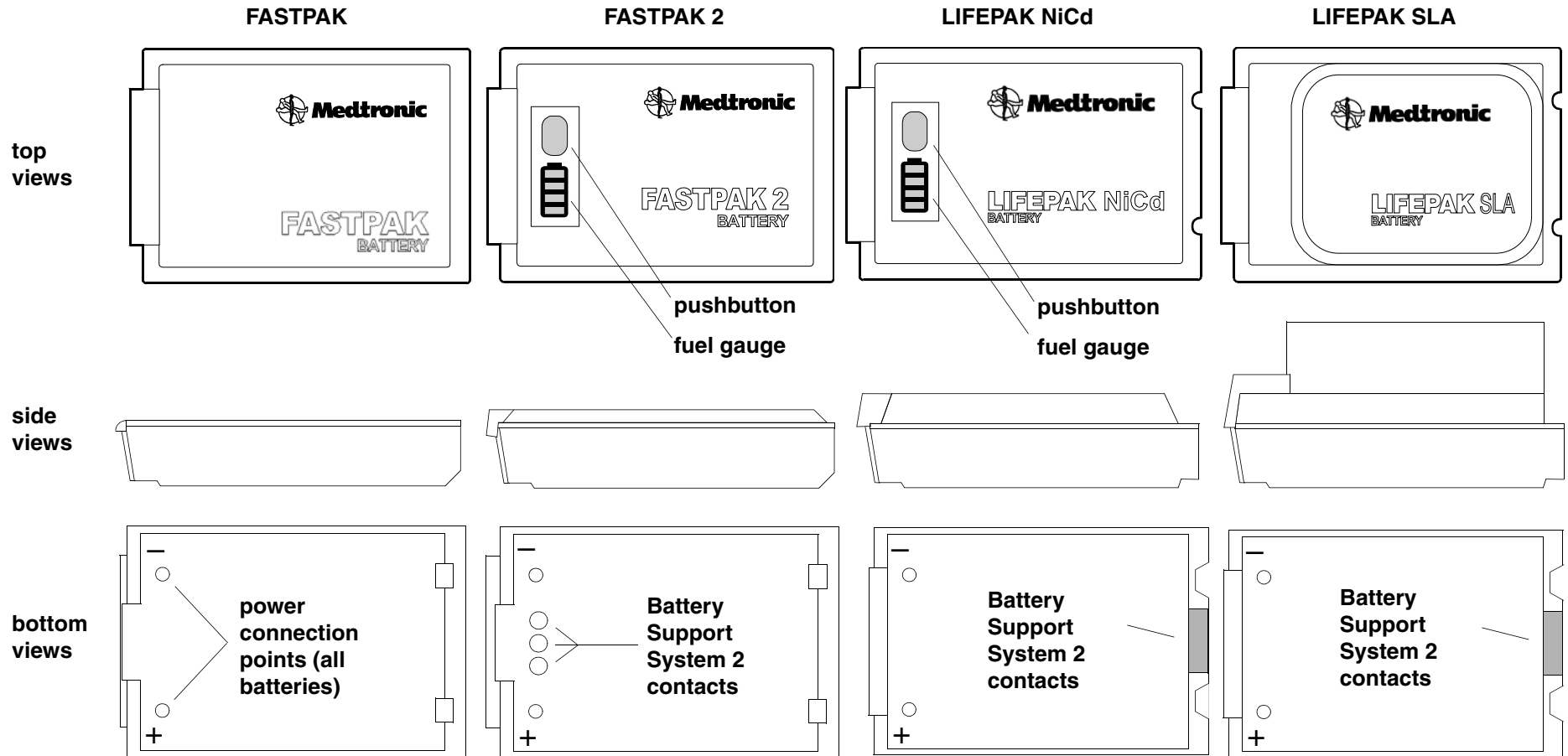
Batteries 1 and 2 have discharged, and the device has switched back to Battery 1. A REPLACE BATTERY message appears.

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, see [Battery Performance Characteristics](#).

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Battery General Characteristics *(continued)*

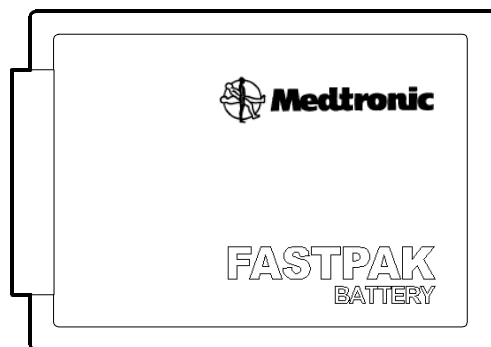
Battery Outlines



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Battery General Characteristics *(continued)*

FASTPAK Battery



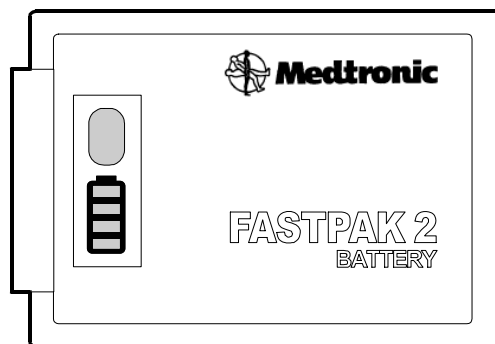
Properly maintained, FASTPAK batteries should have a useful life of at least two years. The FASTPAK battery functions identically to the FASTPAK 2 battery, except that it does not have a pushbutton fuel gauge and cannot communicate with the Battery Support System 2 or Mobile Battery Service Station.

Use the Battery Support System 2 or Mobile Battery Service Station to charge and condition FASTPAK 2 batteries. Use the Battery Support System 2 to perform the shelf-life test on FASTPAK 2 batteries. The LIFEPAK 12 defibrillator/monitor, when powered by an external power adapter, can also be used to charge FASTPAK batteries but cannot condition them.

Note: While it is permissible to charge the FASTPAK battery in the Battery Support System (MIN 801807), it is beyond the scope of this manual to describe this process.

Battery General Characteristics *(continued)*

FASTPAK 2 Battery



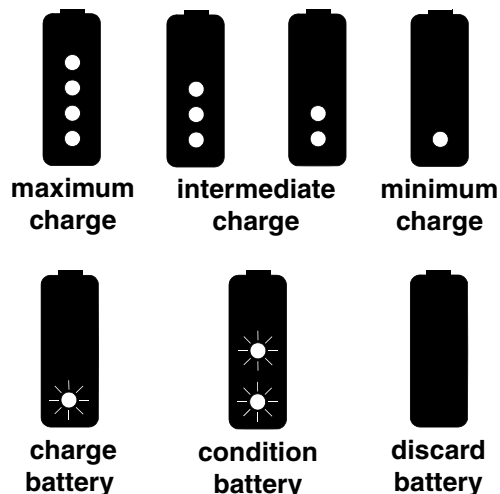
The FASTPAK 2 battery functions identically to the FASTPAK battery, except that it has a pushbutton fuel gauge and internal circuitry for communication with the Battery Support System 2 and Mobile Battery Service Station.

The FASTPAK 2 battery pushbutton fuel gauge provides a visual indication of battery capacity and battery condition through a series of four green LEDs. Pressing this button illuminates the LEDs in one of the following patterns:

- 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.**

CAUTION!

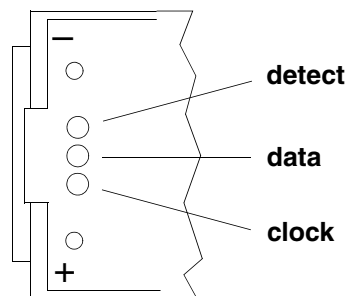
Possible inaccurate battery charge indicator. Using the Battery Support System (MIN 801807) or the LIFEPAK 12 defibrillator/monitor (powered by an external power adapter) to charge and maintain a FASTPAK 2 battery will eventually result in an inaccurate battery charge level indicator. Use only the Battery Support System 2 or Mobile Battery Service Station to charge and condition FASTPAK 2 batteries. The Battery Support System 2 is also used to perform the shelf-life test on batteries.



(Continued on next page)

Battery General Characteristics *(continued)*

FASTPAK 2 Battery *(continued)*



**Battery Support System 2
battery contacts**

The FASTPAK 2 battery communicates through contacts located on the bottom of the battery, allowing the exchange of information about battery type, amp hours rating, charge rate, target voltage, current, and other parameters.

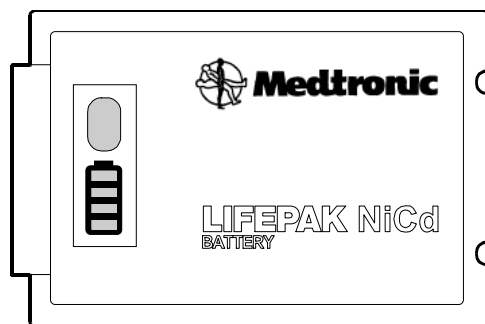
Properly maintained, FASTPAK 2 batteries should have a useful life of at least two years, although internal parameters will establish useful battery life. You should discard/recycle the FASTPAK 2 battery under any of the following conditions:

- Has been charged/discharged more than 750 times.
- Reaches two years of age.
- Displays a DISCARD message in the Battery Support System 2.
- Has an amp hour characteristic below minimum standards (for example, the rated 1.2 Ah value is below 0.9 Ah).
- Has discharged to a level of 4.5 Vdc, or less.

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Battery General Characteristics *(continued)*

LIFEPAK NiCd Battery

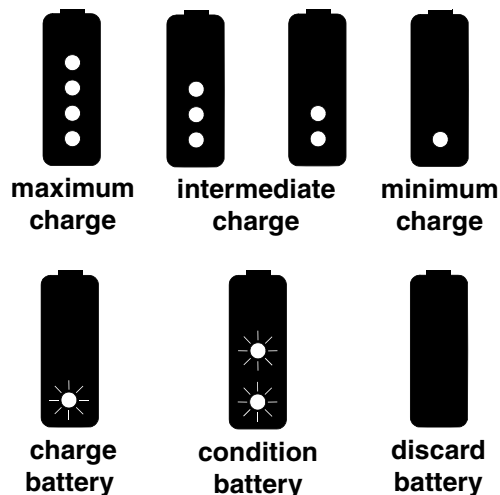


The LIFEPAK NiCd battery has a pushbutton fuel gauge and the ability to communicate with the Battery Support System 2, Mobile Battery Service Station, and LIFEPAK 12 defibrillator/monitor.

The LIFEPAK NiCd battery pushbutton fuel gauge provides a visual indication of battery capacity and battery condition through a series of four green LEDs. Pressing this button illuminates the LEDs in one of the following patterns:

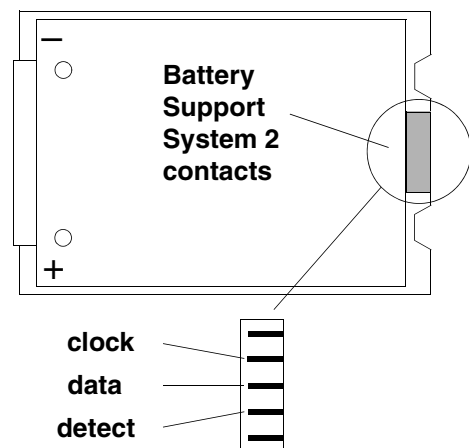
- One to four LEDs indicate the relative charge of the battery, with four lights indicating maximum charge.
- One LED flashing: **Charge the battery.**
- Two LEDs flashing alternately: **Condition the battery.**
- No LEDs in display: Battery has 0% charge and should be **discarded/recycled.**

Note: The LIFEPAK NiCd battery is available in 1.7 Ah and 2.4 Ah versions. The duration of charge, condition, and shelf-life cycles depends on the capacity of the battery used.



Battery General Characteristics *(continued)*

LIFEPAK NiCd Battery *(continued)*



CAUTION!

Possible inaccurate battery charge indicator. Using the Battery Support System (MIN 801807) or the LIFEPAK 12 defibrillator/monitor (powered by an external power adapter) 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 or Mobile Battery Service Station to charge and condition LIFEPAK NiCd batteries.

The LIFEPAK NiCd battery communicates through contacts located on the bottom of the battery, allowing the exchange of information about battery type, amp hours rating, charge rate, target voltage, current, and other parameters.

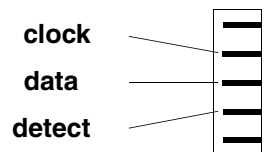
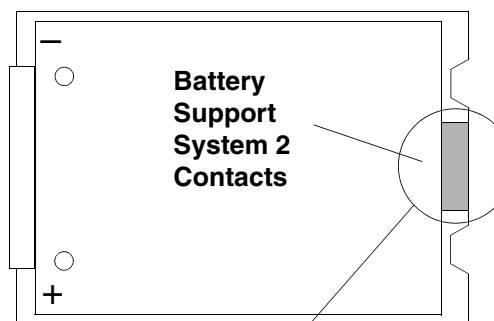
Properly maintained, LIFEPAK NiCd batteries should have a useful life of at least two years, although internal parameters will establish useful battery life. You should discard/recycle a LIFEPAK NiCd battery under any of the following conditions:

- Reaches two years of age.
- Displays a DISCARD message in the Battery Support System 2.
- Has an amp hour characteristic below minimum standards (for example, the rated 1.7 Ah value is below 1.3 Ah).
- Has discharged to a level of 4.5 Vdc, or less.

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Battery General Characteristics *(continued)*

LIFEPAK SLA Battery



Properly maintained, LIFEPAK SLA batteries have a useful life of up to three years, although internal parameters will establish useful battery life. You should **discard/recycle** the LIFEPAK SLA battery under any of the following conditions:

- Has been charged/discharged more than 100 times.
- Reaches three years of age.
- Displays a DISCARD message in the Battery Support System 2.
- Has an amp hour characteristic below minimum standards (for example, the rated 2.5 Ah value is below 1.9 Ah).
- 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 battery communicates through contacts located on the bottom of the battery. These contacts allow the exchange of information about battery type, amp hours rating, charge rate, target voltage, current, and other parameters.

Use the Battery Support System 2 or Mobile Battery Service Station to charge and condition LIFEPAK SLA batteries (SLA batteries do not require periodic conditioning). Use the Battery Support System 2 to perform the shelf-life test on LIFEPAK SLA batteries.

Battery Performance Characteristics

NiCd Battery Performance Factors

The following three factors affect NiCd battery performance:

- **Temperature** – Charge batteries at a room temperature of 20° C to 25° C (68° F to 78° F) 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 three months.

Voltage depression is often mistakenly called “memory.”

- **Discharge rate** – Batteries discharge when not in use. 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 LIFEPAK battery by performing a **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 at 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

The following three factors 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 new battery performance characteristics of the FASTPAK, FASTPAK 2, LIFEPAK 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 (1.7 Ah)	155	114	85	62	14	8	2	1
LIFEPAK NiCd (2.4 Ah)	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 (1.7 Ah)	145	104	85	60	12	8	2	1
LIFEPAK NiCd (2.4 Ah)	210	150	120	84	18	12	4	2
LIFEPAK SLA	170	122	100	71	14	10	2	1

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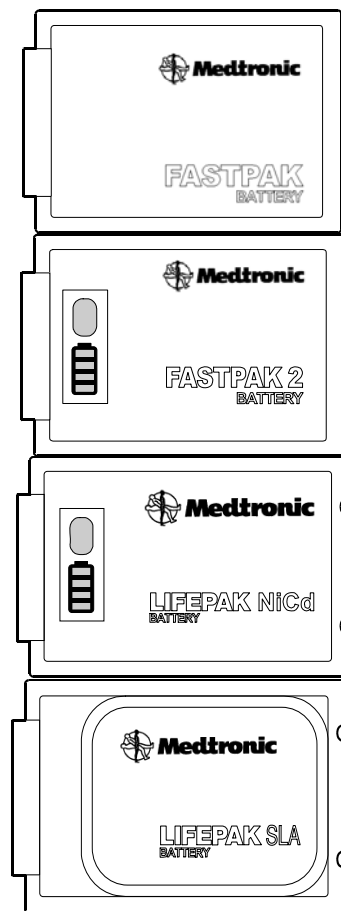
Battery Performance Characteristics *(continued)*

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-joule discharges)								
FASTPAK/ FASTPAK 2 NiCd	80	72	45	40	7	7	3	3
LIFEPAK NiCd (1.7 Ah)	110	99	60	54	10	10	3	3
LIFEPAK NiCd (2.4 Ah)	160	144	90	80	14	14	6	6
LIFEPAK SLA	145	131	85	76	12	12	3	3

Charging Batteries

Overview



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 equipment to charge and condition batteries.

Batteries can be charged in the Battery Support System 2, Mobile Battery Service Station, or LIFEPAK 12 defibrillator/monitor (powered by an external power adapter).

- **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 (25 minutes in the 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 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**.

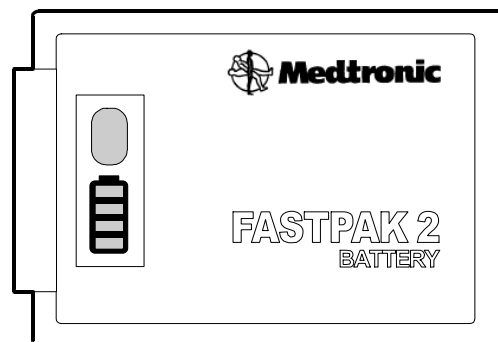
2. Remove the charged battery when the READY indicator illuminates, or leave it in the battery charger to maintain the battery at peak capacity.

Note: If the DISCARD indicator illuminates after recharging, the battery has low capacity. Remove the battery and discard/recycle.

(Continued on next page)

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 (30 minutes in the 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 FASTPAK 2 battery.

Note: If a FASTPAK 2 battery is charged in the Battery Support System (MIN 801807) or the LIFEPAK 12 defibrillator/monitor (powered by an external power adapter), the battery fuel gauge will eventually give false indications. To correct this problem, see [FASTPAK 2 Battery Conditioning](#).

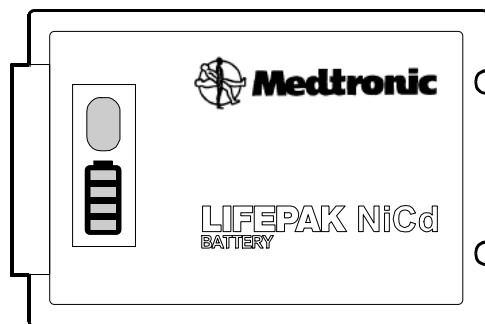
◆ To charge a FASTPAK 2 battery in the Battery Support System 2 or Mobile Battery Service Station:

1. Place the battery in an open charging bay. The CHARGE indicator illuminates.
Note: If the DISCARD indicator illuminates, remove and [discard/recycle](#) the battery. If the CONDITION indicator illuminates, see [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.

(Continued on next page)

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 the Mobile Battery Service Station) for the 1.7 Ah battery, and 3 hours (60 minutes in the Mobile Battery Service Station) for the 2.4 Ah 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 Battery Support System (MIN 801807) or the LIFEPAK 12 defibrillator/monitor (powered by an external power adapter), the battery fuel gauge will eventually display false indications. To correct this problem, see [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 the 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, remove and **discard/recycle** the battery.

Note: If the CONDITION indicator illuminates, see **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.

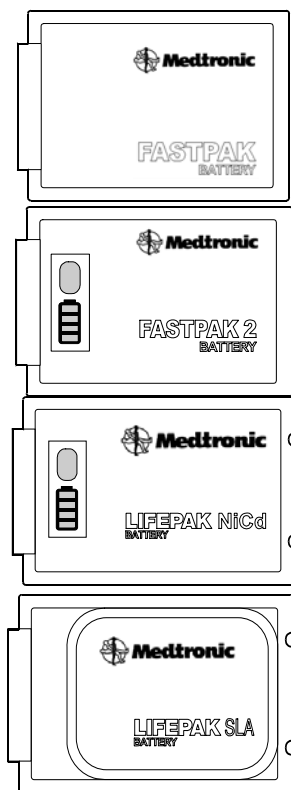
Note: If the DISCARD indicator illuminates after recharging, the battery has low capacity. Remove the battery and discard/recycle.

Note: The LIFEPAK SLA battery can be charged in the LIFEPAK 12 defibrillator/monitor, powered by an external power adapter, if desired.

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Charging Batteries *(continued)*

Battery Charging in the LIFEPAK 12 Defibrillator/Monitor



Each of these batteries can be charged in the LIFEPAK 12 defibrillator/monitor, powered by an external power adapter. See “AC and DC Power Adapters” in the operating instructions for details about charging batteries installed in the LIFEPAK 12 defibrillator/monitor.

WARNINGS!

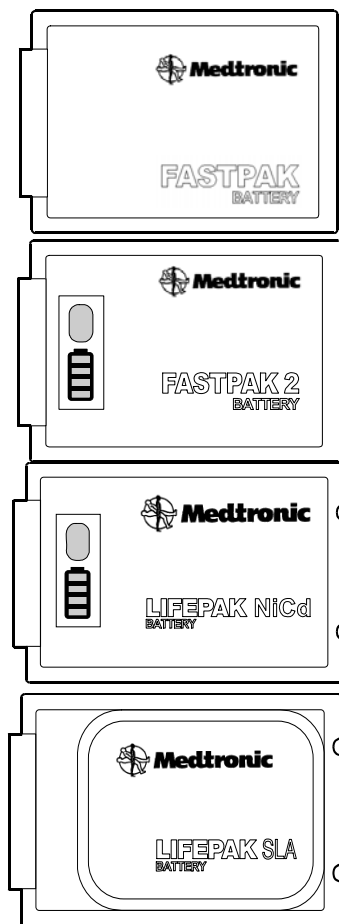
Possible device shutdown during patient care. The external power adapters trickle-charge batteries; they do not maintain batteries. Maintain batteries with the appropriate equipment.

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).

Conditioning Batteries

Overview



Conditioning consists of a series of charge/deep discharge cycles 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 only.

Note: While it is permissible to condition the FASTPAK battery in the Battery Support System (MIN 801807), 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 FASTPAK, FASTPAK 2, or LIFEPAK NiCd batteries is every three months. LIFEPAK SLA batteries can be conditioned as desired; routine conditioning is not required.

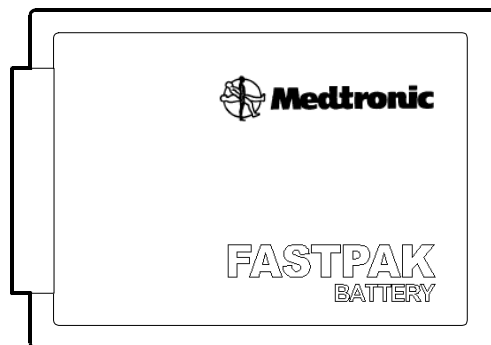
For detailed instructions on battery conditioning, select from the following:

- [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 needed 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.

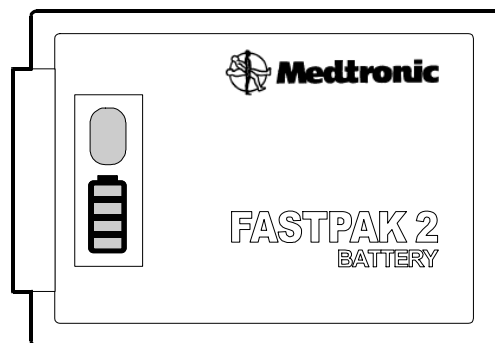
- ◆ To condition a FASTPAK battery in the Battery Support System 2:
 1. Place the battery in any battery well.
 2. Press the CONDITION button.
 3. The READY indicator illuminates after conditioning is complete.
 - ◆ To condition a FASTPAK battery in the Mobile Battery Service Station:
 1. Place the battery in any battery well.
 2. Remove the battery from the battery well when the CHARGING indicator illuminates. The display will change to CONDITIONING for about 3 seconds.
 3. Reinsert 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.

(Continued on next page)

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 three seconds.
 3. Reinsert 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.

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Conditioning Batteries *(continued)*

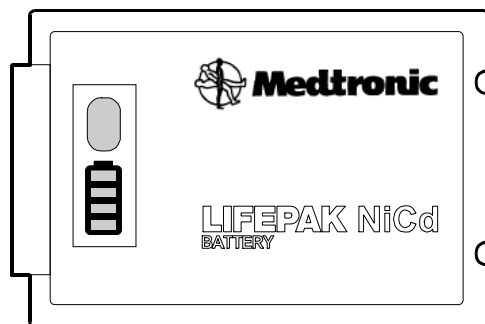
LIFEPAK NiCd Battery Conditioning

The approximate time needed to condition a LIFEPAK NiCd battery is shown in the following table:

	1.7 Ah Battery	2.4 Ah Battery
Battery Support System 2	10 hours	11 hours
Mobile Battery Service Station	3 hours	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 button.
 3. The READY indicator illuminates after conditioning is complete.



Conditioning Batteries *(continued)*

LIFEPAK NiCd Battery Conditioning *(continued)*

- ◆ 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 three seconds.
 3. Reinsert 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; however, conditioning can be used to test battery performance or to determine whether a battery is viable.

The approximate time for conditioning an SLA battery in the Battery Support System 2 is 28 hours, 56 hours maximum (7 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 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:

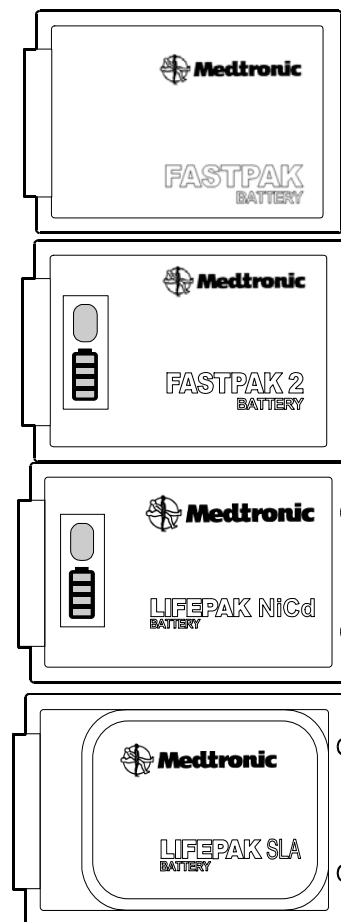
1. Place the battery in any battery well.
2. Remove the battery from the battery well when the CHARGING indicator illuminates. The CONDITIONING indicator will illuminate for about 3 seconds.
3. Reinsert the battery again while the CONDITIONING indicator is illuminated.

Note: If the DISCARD indicator illuminates, remove the battery from use and **discard/recycle**.

4. Remove the charged battery when the READY indicator illuminates, or leave it in the battery charger to maintain the battery at peak capacity.

Testing Battery Shelf-Life

Overview



The battery shelf-life test is performed in the Battery Support System 2 only. This 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: The 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 Battery Support System (MIN 801807), it is beyond the scope of this manual to describe that process.

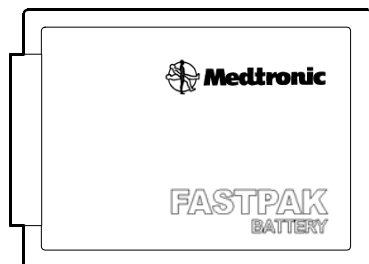
For detailed instructions on shelf-life testing, select from the following:

- **FASTPAK Battery Shelf-Life Test**
- **FASTPAK 2 Battery Shelf-Life Test**
- **LIFEPAK NiCd Battery Shelf-Life Test**
- **LIFEPAK SLA Battery Shelf-Life Test**

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Testing Battery Shelf-life *(continued)*

FASTPAK Battery Shelf-Life Test

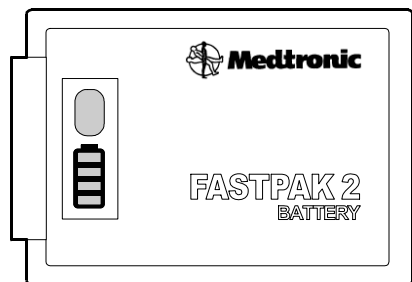


Allow approximately eight days to test the shelf-life of a FASTPAK battery. Maintain an ambient temperature for the Battery Support System 2 between 20° C and 25.5° C (68° F and 78° F).

- ◆ To test the shelf-life of a FASTPAK battery in the Battery Support System 2:
 1. Complete the **FASTPAK Battery Conditioning** procedure for the battery. Remove the battery from the Battery Support System 2 and store it for seven days.
 2. After seven days have elapsed, place the battery in any battery well of the Battery Support System 2, and then press the SHELF LIFE button within three seconds. Verify that 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 the shelf-life test. Remove the battery and **discard/recycle**.

Testing Battery Shelf-life *(continued)*

FASTPAK 2 Battery Shelf-Life Test



Allow approximately eight days to test the shelf-life of a FASTPAK 2 battery. Maintain an ambient temperature for the Battery Support System 2 between 20° C and 25.5° C (68° F and 78° F).

To test the shelf-life of a FASTPAK 2 battery in the Battery Support System 2:

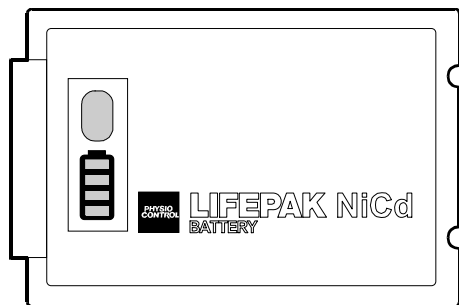
1. Complete **FASTPAK 2 Battery Conditioning** for the battery. Remove the battery from the Battery Support System 2 and store it for seven days.
2. After seven days have elapsed, place the battery in any battery well of the Battery Support System 2, and then press the SHELF LIFE button within three seconds. Verify that 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 the shelf-life test. Remove the battery and **discard/recycle**.

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Testing Battery Shelf-life *(continued)*

LIFEPAK NiCd Battery Shelf-Life Test



Allow approximately eight days to test the shelf-life of a 1.7 Ah or 2.4 Ah LIFEPAK NiCd battery. Maintain an ambient temperature for the Battery Support System 2 between 20° C and 25.5° C (68° F and 78° F).

◆ To test the shelf-life of a LIFEPAK NiCd battery in the Battery Support System 2:

1. Complete the **LIFEPAK NiCd Battery Conditioning** procedure for the battery. Remove the battery from the Battery Support System 2 and store it for seven days.
2. After seven days have elapsed, place the battery in any battery well of the Battery Support System 2, and then press the SHELF LIFE button within three 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 the 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 eight days to test the shelf-life of a LIFEPAK SLA battery. Maintain an ambient temperature for the Battery Support System 2 between 20° C and 25.5° C (68° F and 78° F).

◆ To test the shelf-life of 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 it for seven days.
2. After seven days have elapsed, place the battery in any battery well of the Battery Support System 2, and then press the SHELF LIFE button within three 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 the shelf-life test. Remove the battery and **discard/recycle**.

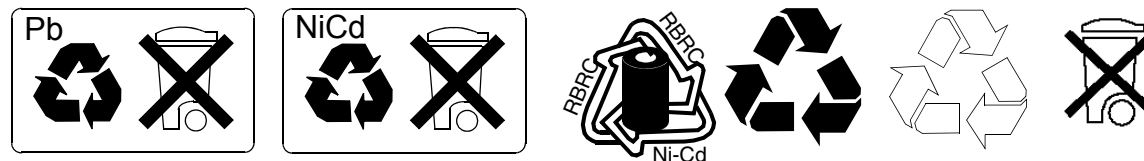
Discarding/Recycling Batteries

Properly maintained NiCd batteries should have a useful life of at least two years. Properly maintained sealed lead-acid batteries should have a useful life of up to three 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 Service 2 indicates DISCARD during any maintenance procedure.

Recycle batteries locally according to national, regional, and local governmental regulations. If recycling is not possible, contact a Physio-Control representative for information or assistance. In the U.S., call 1.800.442.1142.

To promote awareness of battery recycling, 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 (see **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.

Coin Battery

The coin battery, MIN 202305-000 (type CR2032), powers the device real-time clock and a 32kx8 NVRAM memory component that stores the device configuration data, calibration data, and other important data. A depleted or removed battery will cause loss of calibration, serial number, manufacturing code, time and date. The coin battery should be replaced every five years. Call your service technician for assistance when **coin battery replacement** is required.

Replacement Procedures

The replacement procedures are a set of detailed instructions for disassembly, handling, and reassembly of replaceable LIFEPAK 12 defibrillator/monitor parts. 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. See the [interconnect diagram](#) for additional information.

Before replacing any parts, review the following items:

[Summary of Replacement Procedures](#)

[Warnings and Cautions](#)

[Static-Sensitive Device Handling](#)

[Tools List](#)

[Capacitor Discharge Tool](#)

[Discharging the Energy Storage Capacitor](#)

[Discharging the C15 Pacing Capacitor](#)

[Saving and Restoring the Setup Configuration](#)

[Disassembling the Case](#)

[Reassembling the Case](#)

[Software and Device Upgrades](#)

[Verifying the Configuration Data](#)

Summary of Replacement Procedures

Replacement procedures are referenced and linked in the **inside front case diagram** and **inside rear case diagrams**. Most activities start with **disassembling the case**. To simplify cable referencing, the cable number only is sometimes used in the replacement procedures. For example, the W01 Power/System PCB Cable may be referred to in procedures as the W01 cable.

Inside Front Case Part Replacement Procedures

Choose from the following inside front case replacement procedures (in alphanumerical order):

A05 Interface PCB
A08 Backlight PCB—LCD Devices
A09 Small Keypad
A10 Large Keypad
A11 EL Display Assembly
A11 LCD Assembly
Front Case
Front Case Metal Shield—LCD Devices
W04 System/Interface PCB Cable
W06 Backlight/Interface PCB Cable
W11 Therapy Connector Cable

W12 Small Keypad/Interface PCB Cable
W13 Large Keypad/Interface PCB Cable
W15 Selector Assembly
W16 Printer Assembly/Interface PCB Cable
W17 Speaker Assembly
**W18 LCD Assembly/Interface PCB Cable—
LCD Devices**
**W19 Printer Assembly/Chassis Ground
Cable**
W32 EL Assembly/Interface PCB Cable

(Continued on next page)

Summary of Replacement Procedures *(continued)*

Inside Rear Case Part Replacement Procedures

Choose from the following inside rear case replacement procedures (in alphanumerical order):

A01 System PCB

A02 Memory PCB

A03 Power PCB

A03 Power PCB Fuses

A04 Therapy PCB

A06 OEM PCB

A13 Transfer Relay Assembly—Biphasic Devices

A13 Transfer Relay Assembly—Monophasic Devices

A14 Inductive Resistor—Biphasic Devices

A14 Waveshaping Inductor—Monophasic Devices

A15 Energy Storage Capacitor

A16 SpO2 Module—Masimo Configuration

A16 SpO2 Module—Nellcor Configuration

A17 Interconnect Bracket

A21 NIBP Module

A22 Biphasic Module—Biphasic Devices

A23 CO2 Module/Mini-CO2 Module

Coin Battery

EMI Shield—Current version

EMI Shield—Older Version

NIBP Connector

Parameter Bezel—Masimo Configuration

Parameter Bezel—Nellcor Configuration

Rear Case—Biphasic Devices

Rear Case—Monophasic Devices

System/Memory/Therapy PCB Assembly

W01 Power/System PCB Cable

W02 Power/Therapy PCB Cable

W03 System/Therapy PCB Connector

W05 Power/Contact PCB Cable

W07 ECG Connector Cable

W08 System Connector Cable

W09 Auxiliary Connector Cable

(Continued on next page)

Summary of Replacement Procedures *(continued)*

Inside Rear Case Part Replacement Procedures *(continued)*

**W10 Battery Pins/Power PCB Cable—
Biphasic Devices**

**W10 Battery Pins/Power PCB Cable—
Monophasic Devices**

W14 System PCB/PC Card Slot Cable

W20 Biphasic Cable

W21 OEM PCB/SpO2 Module Cable—Masimo

W21 OEM PCB/SpO2 Module Cable—Nellcor

W22 SpO2 Connector Cable—Masimo

W22 SpO2 Connector Cable—Nellcor

W26 OEM PCB/CO2 Cable

W27 OEM PCB/NIBP Cable

W28 CO2 Inlet Connector Cable

W33 Invasive Pressure Connector Assembly

Additional Part Replacement Procedures

Choose from the following procedures (in alphanumerical order) for parts outside the front or rear case.

A07 Contact PCB

A12 Printer Assembly (50 mm)

A12 Printer Assembly (100 mm)

Battery Pins

LIFEPAK 12 Voice Recorder

Repairing the A12 Printer (50 mm)

Repairing the A12 Printer (100 mm)

Therapy Connector Guard

Therapy Cable Shield

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 PCBs contain static-sensitive devices (SSDs). To avoid damage, observe the special handling practices described in [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.

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 anti-static racks or inside conductive bags. Label the package containing 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 anti-static parts of the work area (mat, straps, cables) routinely. Keep a log of the test results.

Tools List

The suggested list of tools for the LIFEPAK 12 defibrillator/monitor replacement procedures are as follows:

- Static-dissipative mat and wrist strap
- Anti-static rack and/or conductive bags
- Capacitor discharge tool
- Point 0 - Phillips screwdriver for 2-56 screws
- Point 1 - Phillips screwdriver for 4-40 screws
- Point 2 - Phillips screwdriver for 6-62 screws
- Small slotted screwdriver for therapy connector clip
- Stylus tool for label removal
- Diagonal cutter
- Needle nose pliers
- Slip-joint pliers and/or adjustable wrench
- 1/4-inch nutdriver
- 5/32-inch nutdriver for battery pins, MIN SVC-T-653 or equivalent

Capacitor Discharge Tool

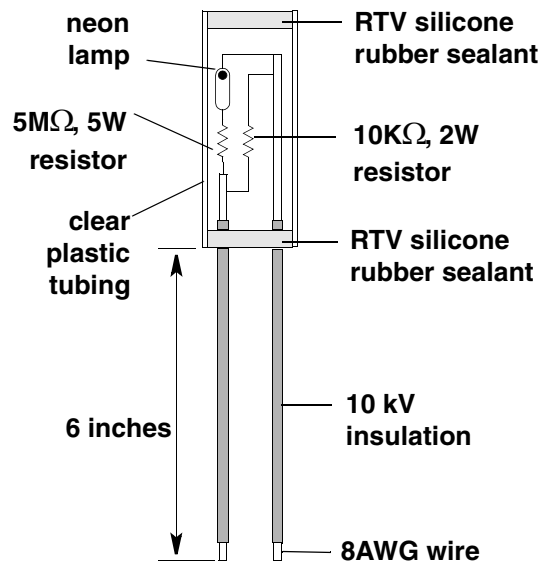
A capacitor discharge tool is used to **discharge the energy storage capacitor** and **the pacing capacitor**. Third party biphasic capacitor discharge tools are available for purchase. Contact a Physio-Control Technical Support Representative for more information.

WARNING!

Shock hazard. Capacitor discharge tools that are not designed and labeled for biphasic use are inadequate for use on biphasic defibrillators and will take several minutes to discharge the energy capacitor.

The illustration shows how the biphasic capacitor discharge tool is constructed. The materials used in this example are:

- 10 k Ω , 2 W resistor (ten 1 K Ω 2 W), high-voltage
- 5 M Ω , 5 W resistor, high-voltage
- Neon lamp, NE76, NE2, or NE2H
- 8 AWG copper wire
- Clear plastic tubing, capable of insulating 10 kV
- 10 kV insulation
- RTV silicone rubber sealant



(Continued on next page)

Capacitor Discharge Tool *(continued)*

Using the Capacitor Discharge Tool

- ◆ 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!

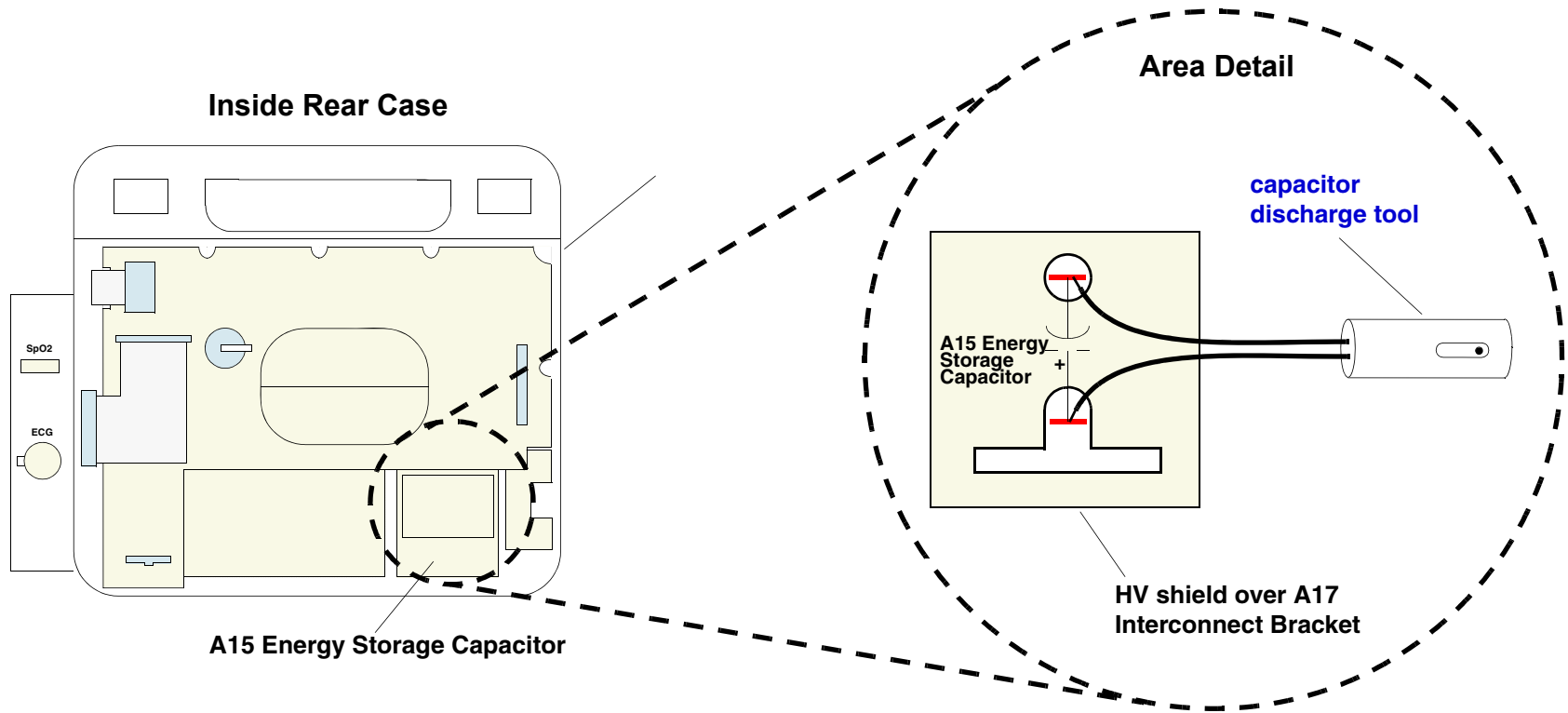
Shock hazard. Do not assume the capacitor is uncharged if the neon lamp does not light! There may still be a charge on the capacitor. Do not touch capacitor terminals until completing the discharge operation.

4. Continue holding the probes on the points indicated for at least 30 seconds after the neon lamp is no longer lit.

Discharging the Energy Storage Capacitor

Location of Discharge Points

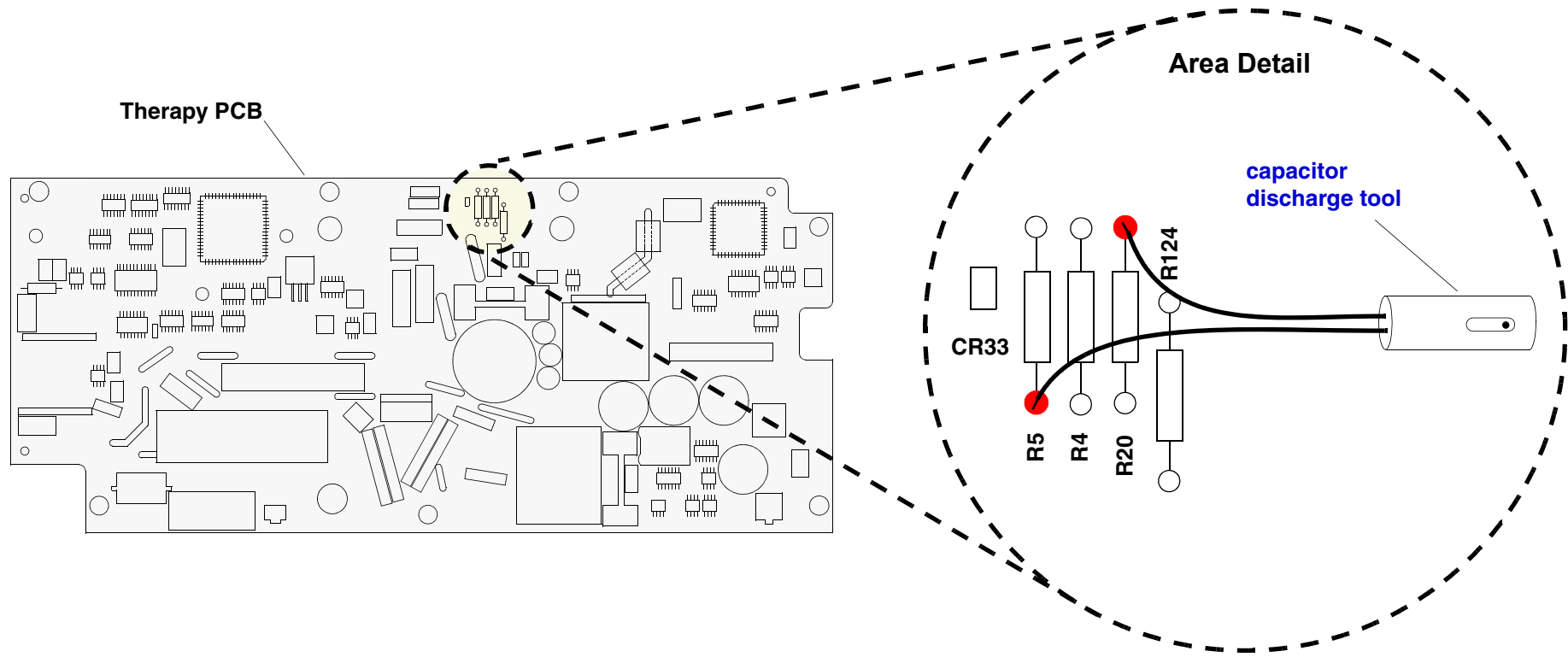
After **disassembling the case**, immediately discharge the energy storage capacitor using the **capacitor discharge tool**. The discharge points are located through holes on the A17 Interconnect Bracket in the rear case.



Discharging the C15 Pacing Capacitor

Location of Discharge Points

After **removing the System/Memory/Therapy PCBs**, immediately discharge the Pacing Capacitor using the **capacitor discharge tool**. The discharge points are located at resistors R5 and R20 on the Therapy PCB.



Saving and Restoring the Setup Configuration

Transferring and Saving the Setup Configuration

Before beginning any repair action, the existing setup configuration should be preserved using either of the following methods:

- The best method is to transfer the existing setup configuration to another LIFEPAK 12 defibrillator/monitor, complete repairs, and then transfer the setup configuration back again.
- The second method is to print the existing setup configuration, complete repairs, and then manually reconfigure the device.

Note: Transferring and saving the setup configuration requires the software in the spare device receiving the setup configuration to be of the same revision as the device being serviced. Otherwise potentially unexpected results may occur once the configuration has been restored to the repaired device. Both devices must also have the same energy configurations (either both monophasic or both biphasic). After restoring the configuration, the configuration information for default energy levels must be verified and, if required, restored manually.

- ◆ To transfer and save the setup configuration into a spare device:
 1. With the power OFF on both devices, connect the spare device and the device being serviced with a configuration transfer cable (MIN 3011538) between the device system connectors.
 2. Display the **SETUP** menu on both devices.

(Continued on next page)

Saving and Restoring the Setup Configuration *(continued)*

Transferring and Saving the Setup Configuration *(continued)*

3. On the device being serviced, select SEND CONFIG in the SETUP menu. The SEND CONFIG overlay appears.
4. Select SEND, and then press the SELECTOR to transfer the setup configuration to the spare device.
5. Select PRINT DEFAULTS from the SETUP menu to print the device setup configuration. Save this backup printout for possible future reference.
6. Turn both devices OFF.

Restoring by Transfer

- ◆ To restore the setup configuration by transferring it back to the repaired device:
 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. Display the **SETUP** menu on both devices.
 3. On the spare device, select SEND CONFIG in the SETUP menu. The SEND CONFIG overlay appears.
 4. Select SEND, and then press the SELECTOR to transfer the setup configuration to the repaired device.
 5. Turn both devices OFF.

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Saving and Restoring the Setup Configuration *(continued)*

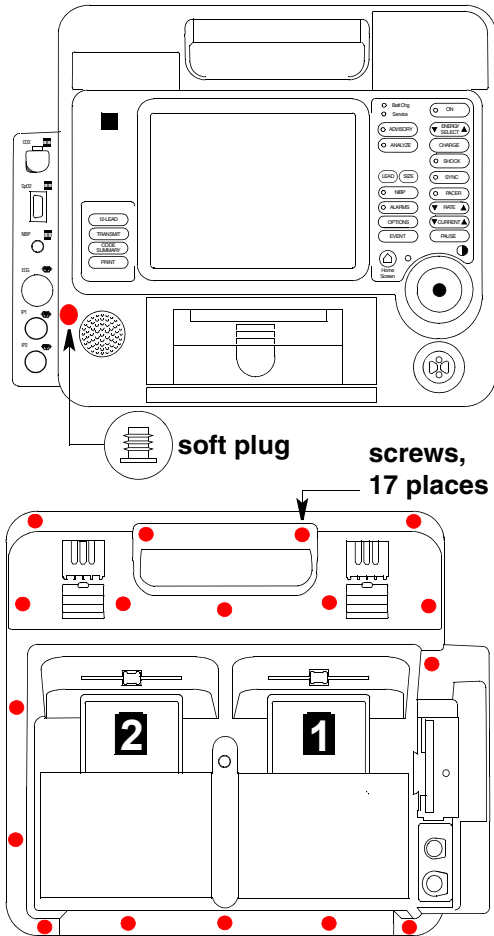
Printing the Setup Configuration

- ◆ To print the setup configuration:
 1. Display the **SETUP** menu.
 2. Select PRINT DEFAULTS to print the device setup configuration. Save this printout for future reference.
 3. Turn the device OFF.
 4. After completing repairs, manually reconfigure the device using the printout.

Restoring the Setup Manually

- ◆ To restore the setup configuration manually:
 1. Display the SETUP menu.
 2. Using the printout from the preceding steps, check the settings in each menu and revise as necessary to match the printout. The printout items are organized in the same manner as the SETUP menu (GENERAL, MANUAL MODE, ADVISORY MODE, and so forth).
 3. Turn the device OFF.

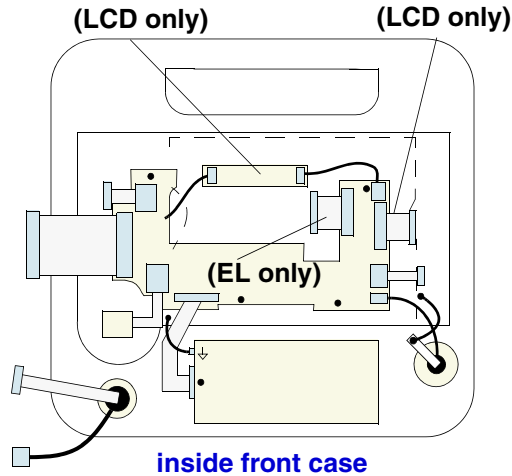
Disassembling the Case



- ◆ To disassemble the case halves:
 1. If applicable, remove carrying case and AC Power Adapter.
 2. Remove all cables and patient connections, and then remove the batteries.
 3. Pry out the front case soft plug (36) and remove the hidden screw.
 4. Lay the defibrillator face down on a protective surface to prevent damage, and then remove and discard the 17 case screws (232), or if the therapy connector guard is installed, remove and discard the 13 case screws.
 5. Remove the **therapy connector guard**.
 6. Holding the case halves together, stand the device upright, and then move the front case away from the rear case.
 7. Press the connector retaining clips to disconnect the W04 System PCB/ Interconnect Cable from the A01 System PCB at J02 in the rear case.
 8. Move the front case away from the rear case as far as possible. Before continuing any further, **discharge the A15 Energy Storage Capacitor**.

(Continued on next page)

Disassembling the Case *(continued)*

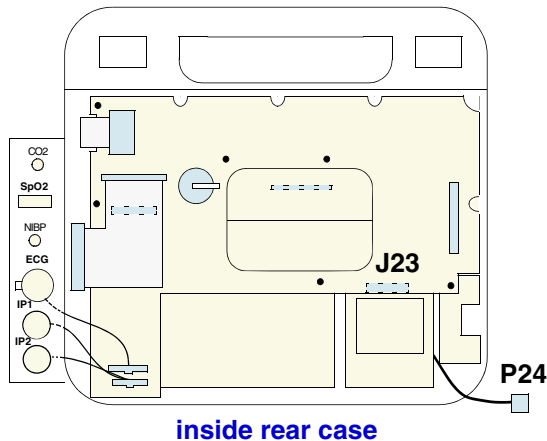


WARNING!

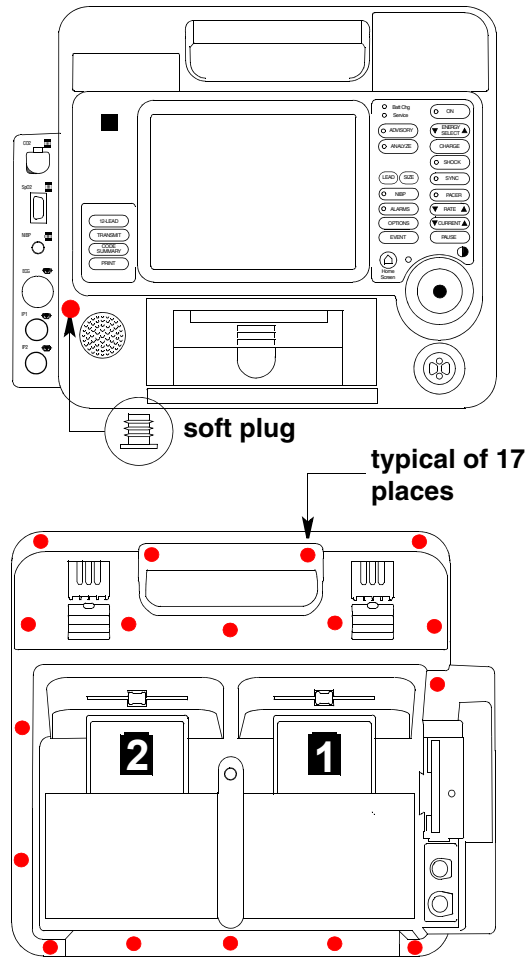
Shock hazard. Discharge tools that were not designed and labeled for biphasic use are inadequate for use on biphasic defibrillators.

- To continue, press the securing clip on the J24 connector to disconnect the W11 Therapy Connector in the front case from the A13 Transfer Relay at P24 in the rear case.
- Spread the securing clips and disconnect the W11 Therapy Connector in the front case at P23 from the J23 connector on the A04 Therapy PCB in the rear case.
- Separate the front and rear cases halves.

For the next procedure, select from the [Summary of Replacement Procedures](#), or continue to [Reassembling the Case](#).



Reassembling the Case



◆ 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 System PCB/Interconnect Cable to the A01 System PCB at J02 in the rear case.
4. Fold the front and rear case halves together and install the 17 new screws (232) (13 screws if the therapy connector guard was reinstalled).
5. Reinstall the **therapy connector guard** if it was removed during disassembly.

CAUTION!

Possible moisture leakage. Visually inspect the mating surfaces between the front and the rear case halves before and after screwing them together to ensure that 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 (232) when assembling the case.

(Continued on next page)

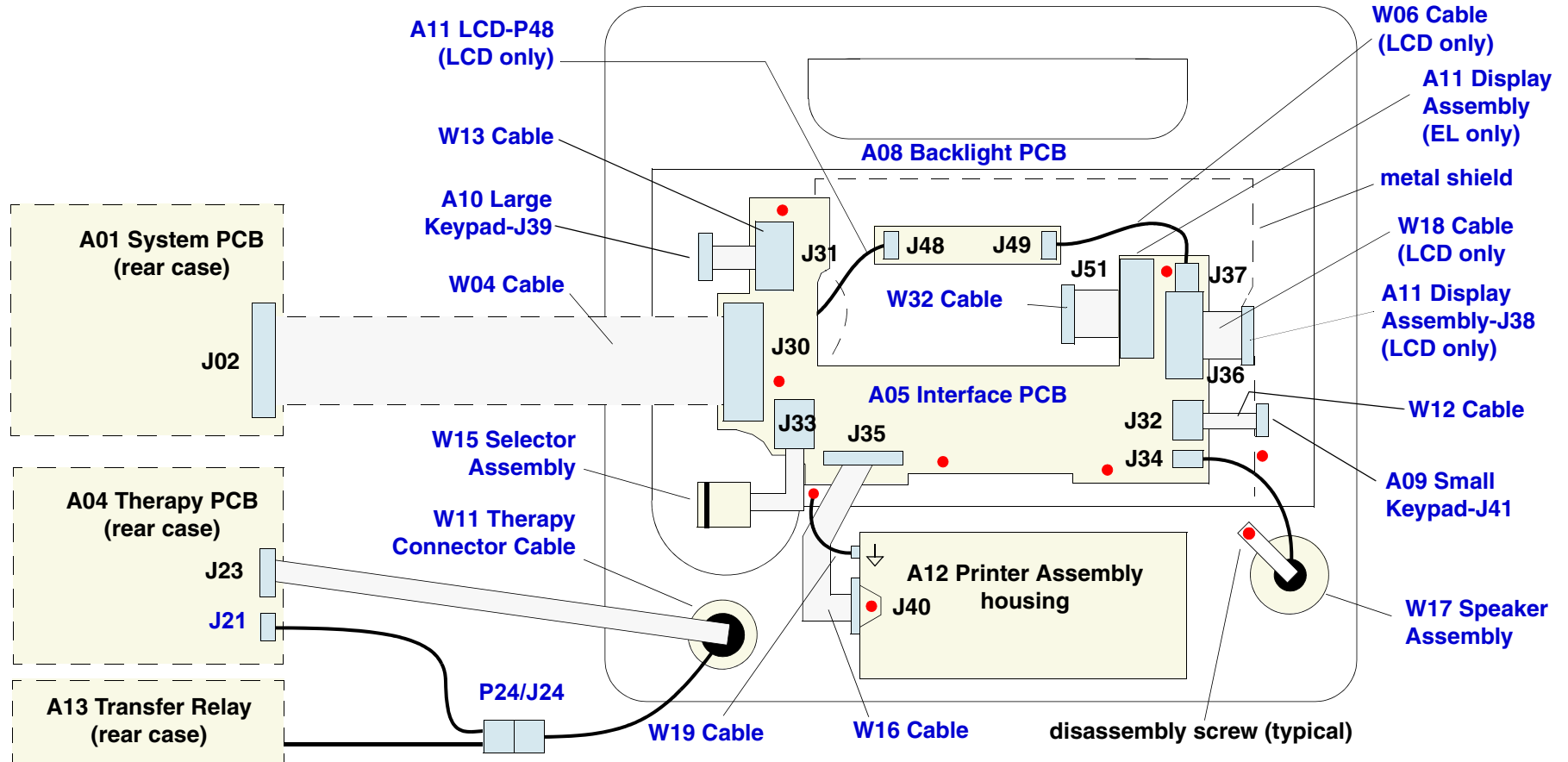
Reassembling the Case *(continued)*

6. Install one new screw ([232](#)) at the front and reinstall the soft plug ([36](#)) covering the screw access hole.
7. Install the batteries.
Note: Pay special attention to the SERVICE indicator as you turn on the device in the next step.
8. If applicable, reinstall carrying case and AC Power Adapter
9. Turn the device ON 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.
10. Complete the Test and Calibration Procedures (TCP), followed by the Performance Inspection Procedures (PIP).
11. Error codes have been written to the error log. Continue to [Processing Error Codes](#) in the Troubleshooting section.

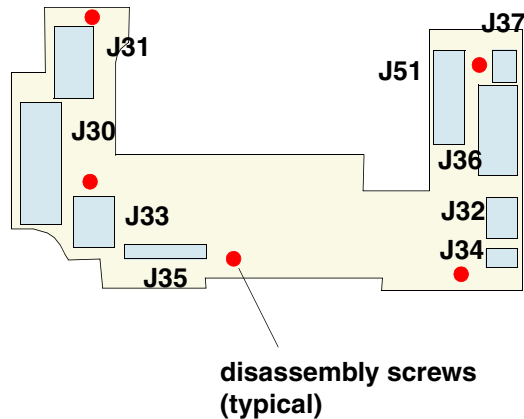
If there is no indication of power, either the batteries are dead, or no batteries are installed, or the W04 cable connection was not made when the case was reassembled. The W04 cable is the ribbon cable between the front case and rear case. Check the batteries and, if they are charged, [disassemble the case](#) and check the W04 cable.

Inside Front Case Diagram

Use the following diagram after **disassembling the case**. For a list of replacement procedures, see the **Summary of Replacement Procedures**.



A05 Interface PCB Replacement



◆ To remove the A05 Interface PCB from the **front case**:

1. **Disassemble the case.**

2. Disconnect the connectors (from top left, counterclockwise) as follows:

- J31 – Press the connector retaining clips and disconnect the W13 cable.
- J30 – Press the connector retaining clips and disconnect the W04 cable.
- J33 – Press the connector retaining clip and disconnect the W15 Selector cable.
- J35 – Spread the connector retaining clips and eject the W16 cable.
- J34 – Press the connector retaining clip and disconnect the W17 Speaker cable.
- J32 – Press the connector retaining clip and disconnect the W12 cable.
- J36 (LCD only) – Spread the connector retaining clips and eject the W18 cable.
- J37 (LCD only) – Press the connector retaining clip and disconnect the W06 cable.
- J51 (EL only) – Spread the connector retaining clips and eject the W32 cable.

3. Remove the five screws (**230**).

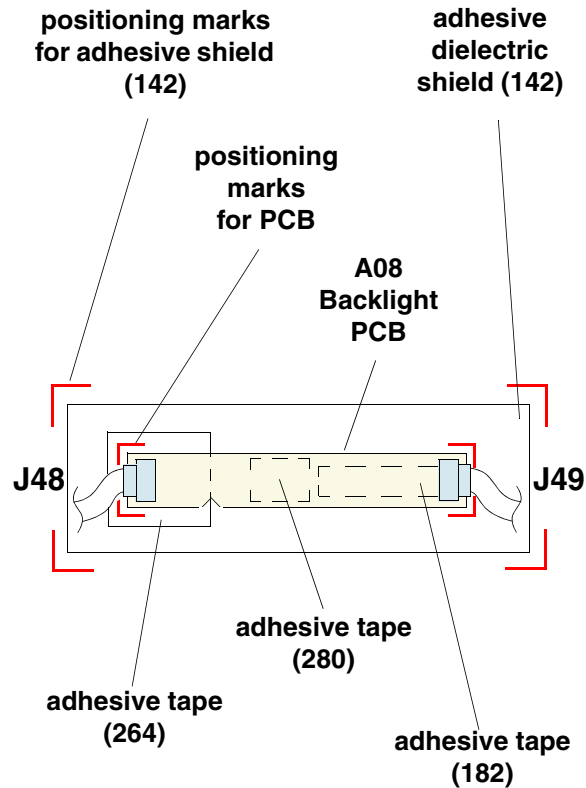
(Continued on next page)

A05 Interface PCB Replacement *(continued)*

- ◆ To install the A05 Interface PCB, reverse the preceding steps. Make sure all connector retaining clips are positioned to secure their respective connectors, and no wires are pinched.

To continue, select from the [Summary of Replacement Procedures](#).

A08 Backlight PCB Replacement—LCD Devices



◆ To remove the A08 Backlight PCB from the **front case**:

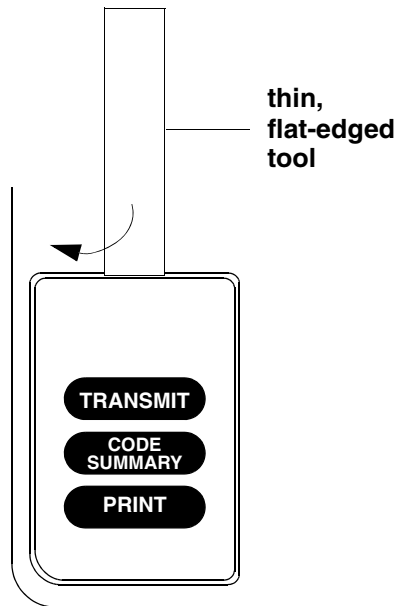
1. **Disassemble the case.**
2. Remove the **A05 Interface PCB.**
3. Disconnect the **W06 cable** from the A08 Backlight PCB at J49.
4. Disconnect the A11 LCD Assembly (P48) from the A08 Backlight PCB at J48.
5. Gently pry and lift the A08 Backlight PCB off the adhesive strip. Do not damage the underlying adhesive shield (**142**).

◆ To install the A08 Backlight PCB:

1. Using a soft, lint-free cloth and isopropyl alcohol, gently remove old adhesive from the adhesive shield (**142**).
2. Apply adhesive tape (**264**) to the adhesive 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 the A11 LCD Assembly (P48) to the A08 Backlight PCB at J48.
6. Reinstall the W06 cable.

To continue, select from the **Summary of Replacement Procedures**.

A09 Small Keypad Replacement



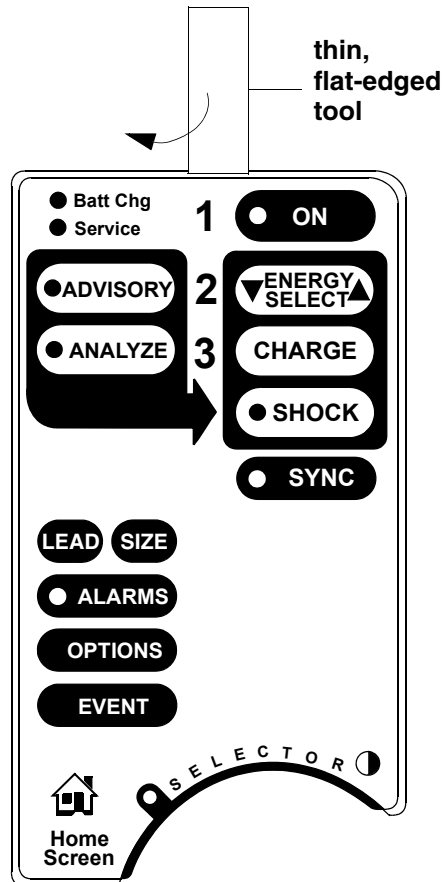
- ◆ To remove the A09 Small Keypad from outside the front case:
 1. Using a very thin, flat-edged tool, gently pry one edge of the A09 Small Keypad until it is released from its adhesive mount. **Do not damage the case.**
 2. Pull the A09 Small Keypad away from the case, extending part of the W12 cable through the keypad opening.
 3. Disconnect the W12 cable from A09 Small Keypad at 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 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 removing the protective covering from the keypad adhesive surface, press the keypad firmly and evenly into the keypad cavity on the front case.

To continue, select from the [Summary of Replacement Procedures](#).

A10 Large Keypad Replacement



standard configuration shown

◆ To remove the A10 Large Keypad from outside the front case:

1. Using a wide, very thin, flat-edged 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 at 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 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.

To continue, select from the [Summary of Replacement Procedures](#).

A11 EL Display Assembly Replacement

◆ To remove the A11 EL Display Assembly from the **front case**:

1. **Disassemble the case.**

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.

2. Remove the **A05 Interface PCB.**

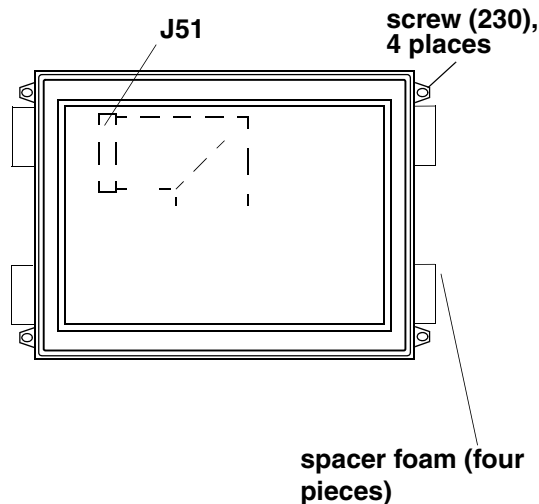
3. Remove the four screws (**230**) from the display bracket. Lift the A11 EL Display Assembly gently away from the front case by lifting up on the corner screw tabs.

4. Remove the four screws (**230**) to separate the EL display from its bracket (see diagram).

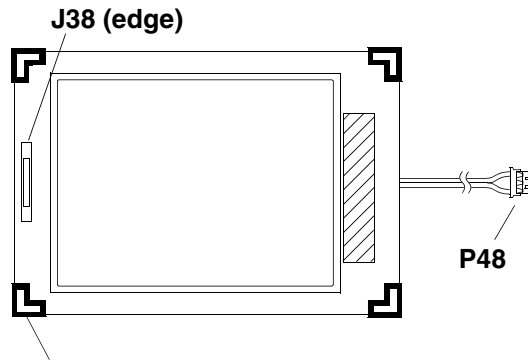
◆ To install the A11 EL Display Assembly, reverse the preceding steps, observing the following:

- Make sure both the A11 EL Display Assembly screen and lens are completely clean and dust-free before reinstalling.
- Make sure to 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 that the lower-left metal shield screw secures the W19 cable eyelet.

To continue, select from the **Summary of Replacement Procedures.**



A11 LCD Assembly Replacement



four black rubber corner shock mounts with the raised portions facing away from the lens

◆ To remove the A11 LCD Assembly from the **front case**:

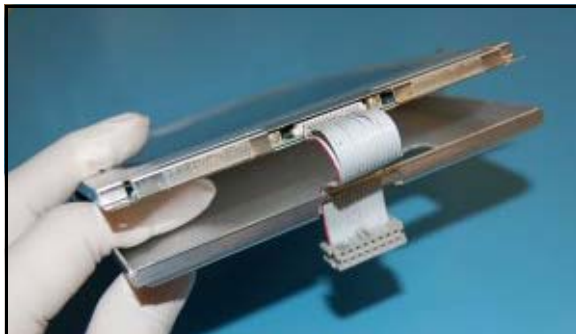
1. **Disassemble the case.**
2. Remove the **front case metal shield.**

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. Lift the A11 LCD Assembly away from the front case by carefully lifting up on the black rubber corner shock mounts **(6)**.
4. Lift the A11 LCD Assembly from the LCD metal case **(467)**, on the J38 side, high enough to disconnect the cable. Disconnect the W18 cable at J38. Remove the A11 LCD Assembly, with the backlight cable, from the slot in the metal casing.

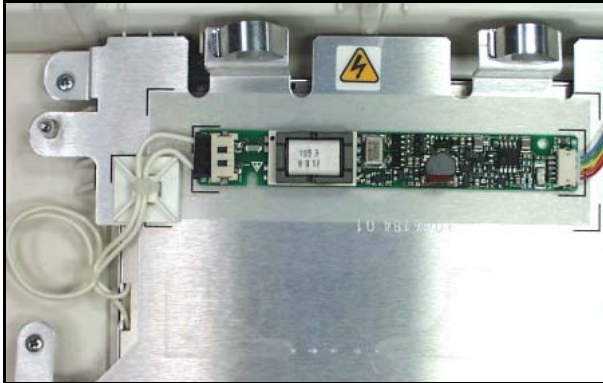
◆ To install the A11 LCD Assembly:

1. Thread the P48 end of the A11 LCD Assembly into the slot in the LCD metal case (467).
2. Thread the W18 cable through the slot and connect it to J38 of the A11 LCD Assembly.
3. Pull the slack out of the cable and seat the A11 LCD Assembly into the LCD metal case.



(Continued on next page)

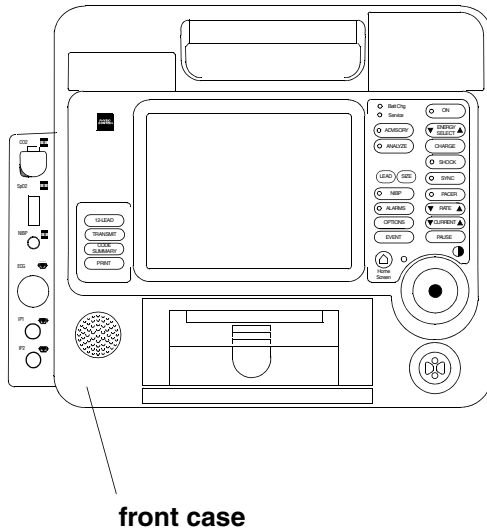
A11 LCD Assembly Replacement *(continued)*



4. Reverse the remainder of the removal steps to install the A11 LCD Assembly, observing the following:
 - Make sure both the A11 LCD Assembly screen and the front case lens are completely clean and dust free before reinstalling.
 - Make 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.
 - Remove the rubber corner shock mounts from the old LCD display.
 - Position the shock mounts on the corners of new display LCD metal case as follows:
 - Ensure that the two shock mounts with white spacers are on the bottom edge of the LCD display.
 - Ensure that the raised portions on the shock mounts face away from the front case lens.
 - Replace the two cable ties (222). One cable tie reattaches the A11 LCD Assembly to the cable tie mount at P48. The other cable tie is used to hold a loop in the cable.

To continue, select from the [Summary of Replacement Procedures](#).

Front Case Replacement



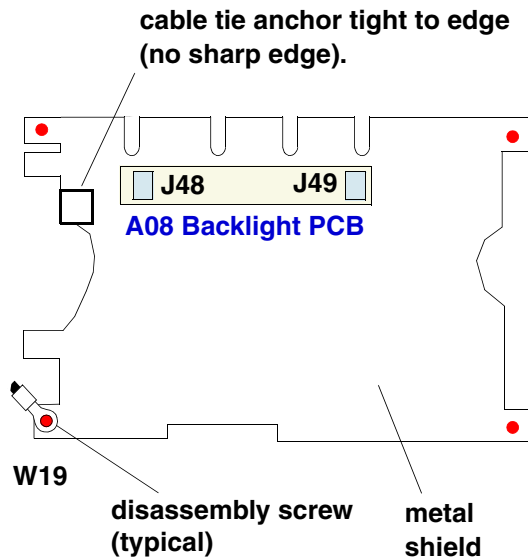
- ◆ To disassemble the **front case**:
 1. Remove the **A12 Printer Assembly**.
 2. **Disassemble the front and rear case halves.**
 3. Remove the **A05 Interface PCB**.
 4. Remove the **front case metal shield** (includes removal of the A08 Backlight PCB on LCD devices).
 5. Remove the **A11 LCD Assembly** or **A11 EL Display Assembly**.
 6. Remove the **W15 Selector Assembly**.
 7. Remove the **W17 Speaker Assembly**.
 8. Remove the **W11 Therapy Connector Cable**.
 9. Remove the **W16 Printer Assembly/Interface PCB Cable** (includes removal of the W19 cable).

Front Case Replacement *(continued)*

- ◆ To install the new front case, reverse the preceding steps, observing the following:
 - Transfer the following parts from the old front case to the new front case:
 - A11 LCD or EL Display Assembly
 - Front case shield
 - A05 Interface PCB
 - W15 Selector Assembly
 - W17 Speaker Assembly
 - W11 Therapy Connector
 - W16 Printer/Interface PCB Cable
 - Printer bracket (50) with W19 cable
 - Printer gasket (204)
 - Install new keypads (make sure the date codes on the new keypads have not expired).

To continue, select from the [Summary of Replacement Procedures](#).

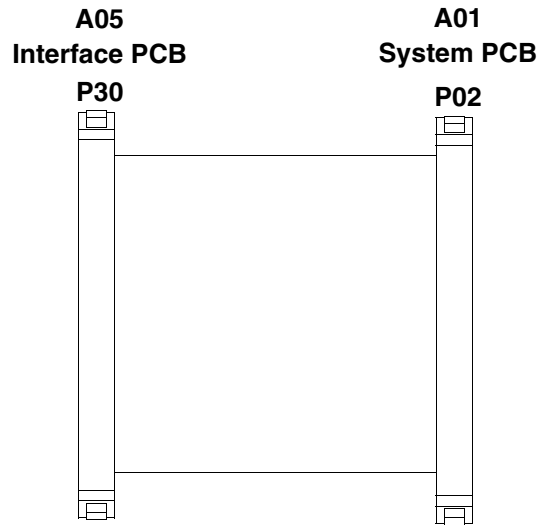
Front Case Metal Shield Replacement—LCD Devices



- ◆ To disassemble the front case metal shield from the **front case** of an LCD device, with the A08 Backlight PCB intact:
 1. **Disassemble the case.**
 2. Remove the **A05 Interface PCB.**
 3. If A08 requires replacement, remove the **A08 Backlight PCB** from the front case metal shield.
 4. Cut the cable tie (**222**) at the cable tie mount that holds the A11 LCD Assembly cable in place.
 5. Disconnect connector P48 on the A11 LCD Assembly from the A08 Backlight PCB at 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, observing the following:
 - Verify connector P48 on the A11 LCD Assembly is not pinched under the shield.
 - When replacing screws, correctly orient the eyelets for the W19 cable and A11 LCD cable.

To continue, select from the **Summary of Replacement Procedures.**

W04 System/Interface PCB Cable Replacement



◆ To remove the W04 cable from the **front case**:

1. **Disassemble the case.** This procedure removes the W04 cable from the A01 System PCB at J02.
2. Press the connector retaining clips to unlock the connector, and then disconnect the W04 cable from the A05 Interface PCB at J30.

Note: Notice the cable markings J02 and J30 during reinstallation. If this cable is installed backwards, it may be pinched between case halves.

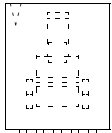
◆ To install the W04 cable, reverse the preceding steps. Make sure you “snap” the connector retaining clips into the locked position.

Note: Notice the cable markings J02 and J30 during reinstallation. If this cable is installed backwards, it may be pinched between case halves.

To continue, select from the [Summary of Replacement Procedures](#).

W06 Backlight PCB/Interface PCB Cable Replacement—LCD Devices

A05
Interface PCB
P37



A08
Backlight PCB
P49

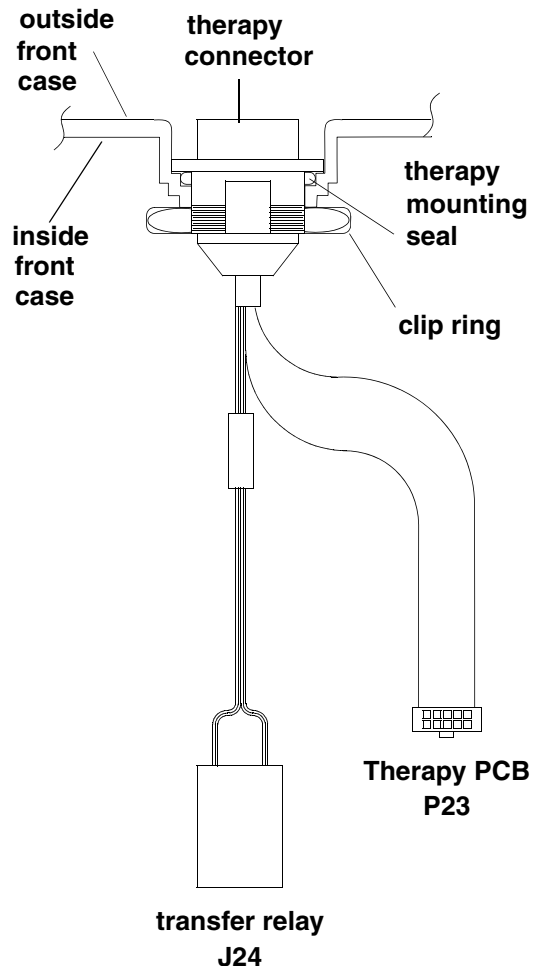


- ◆ To remove the W06 cable from the **front case**:
 1. **Disassemble the case.**
 2. Press the connector retaining clip and disconnect the W06 cable from the A05 Interface PCB at J37.
 3. Place even pressure on the cable and ease the W06 cable out of the J49 connector on the A08 Backlight PCB.

- ◆ To install the W06 cable, reverse the preceding steps.

To continue, select from the **Summary of Replacement Procedures**.

W11 Therapy Connector Cable Replacement

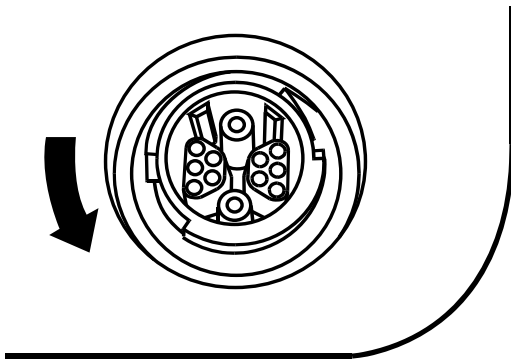


- ◆ To remove the W11 Therapy Connector Cable from the **front case**:
 1. **Disassemble the case.**
 2. From the inside of the front case, use a small, flat-bladed screwdriver to pry the clip ring (**218**) away from the therapy connector at the flat portion of the connector. Set the clip ring aside.
 3. From the outside of the front case, remove the W11 cable and therapy mounting seal from the front case. Discard the therapy mounting seal.

- ◆ To install the W11 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 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 the front case and the 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 in the device, 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!

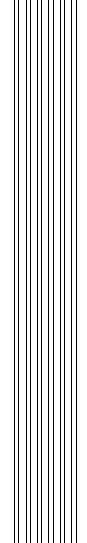
Possible moisture leakage. When installing the therapy connector, use a new therapy mounting seal (238) to help prevent ingress of fluids.

To continue, select from the [Summary of Replacement Procedures](#).

W12 Small Keypad/Interface PCB Cable Replacement

A09 Small Keypad

P41



P32

A05 Interface PCB

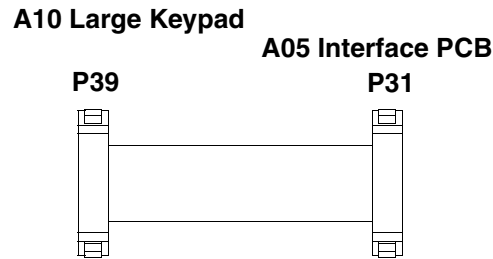
◆ To remove the W12 cable from the **front case**:

1. **Disassemble the case.**
2. Press the connector retaining clip, and then disconnect the W12 cable from the A05 Interface PCB at J32.
3. Press the connector retaining clip, and then disconnect the W12 cable from the A09 Small Keypad at J41.

◆ To install the W12 cable, reverse the preceding steps.

To continue, select from the **Summary of Replacement Procedures**.

W13 Large Keypad/Interface PCB Cable Replacement



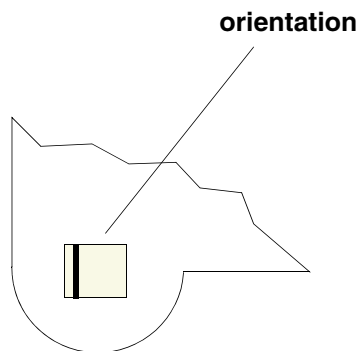
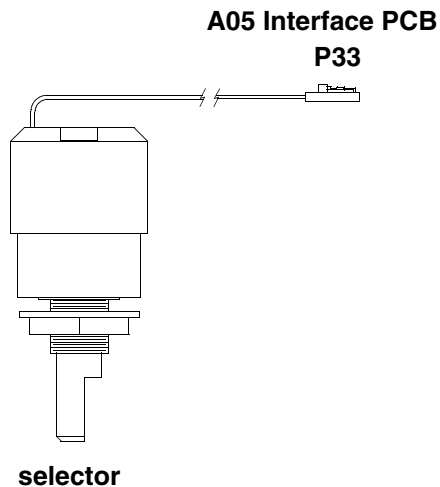
◆ To remove the W13 cable from the **front case**:

1. **Disassemble the case.**
2. Press the connector retaining clips to unlock the connector, and then disconnect the W13 cable from the A05 Interface PCB at J31.
3. Press the connector retaining clips to unlock the connector, and then disconnect the W13 cable from the A10 Large Keypad at J39.

◆ To install the W13 cable, reverse the preceding steps. Make sure you “snap” the connector retaining clips into the locked position.

To continue, select from the **Summary of Replacement Procedures**.

W15 Selector Assembly Replacement



- ◆ To remove the W15 Selector Assembly from the **front case**:
 1. **Disassemble the case.**
 2. Press the connector retaining clip, and then disconnect the W15 Selector Assembly from the A05 Interface PCB at J33.
 3. 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.
 4. 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.
 5. From the inside of the case, pull the W15 Selector Assembly away from the case and remove it.

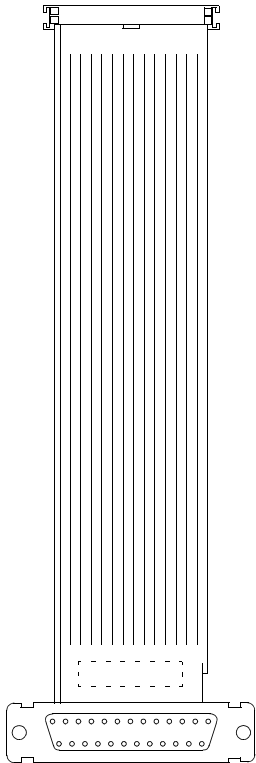
- ◆ To install the W15 Selector Assembly, reverse the preceding steps. Tighten the securing nut.

To continue, select from the **Summary of Replacement Procedures**.

W16 Printer Assembly/Interface PCB Cable Replacement

A05 Interface PCB

P35



P40

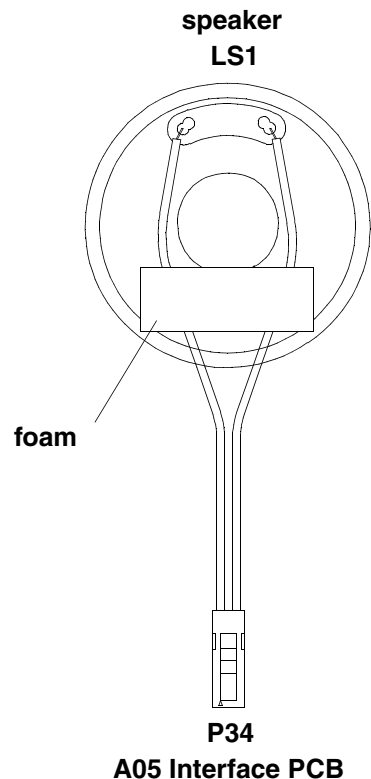
A12 Printer Assembly

- ◆ To remove the W16 cable from the **front case**:
 1. **Disassemble the case.**
 2. Spread the connector retaining clips and eject the W16 cable from the A05 Interface PCB at J35, if the A05 Interface PCB is present.
 3. Disconnect the W19 cable ground terminal from the A12 Printer Assembly connector bracket.
 4. Remove the retaining screw (**230**) and connector bracket (**50**) on the A12 Printer Assembly housing that secures the W16 cable at P40.
 5. With a flat edged tool, gently pry the W16 cable at P40 out of the J40 connector on the A12 Printer Assembly. Remove and discard the rubber moisture gasket (**204**).

- ◆ To install the W16 cable, reverse the preceding steps, observing the following:
 - Use a new rubber moisture gasket (204) during reassembly.
 - Reconnect the W19 cable ground terminal to the A12 Printer Assembly connector bracket before installing the W16 cable.

To continue, select from the [Summary of Replacement Procedures](#).

W17 Speaker Assembly Replacement



- ◆ To remove the W17 Speaker Assembly from the **front case**:
 1. **Disassemble the case.**
 2. Press the connector retaining clip, and then disconnect the W17 Speaker Assembly from the A05 Interface PCB at J34, if the A05 Interface PCB is present.
 3. Remove the screw (**230**) securing the retaining spring (**246**) for the W17 Speaker Assembly. Note the orientation of the retaining spring for reassembly.
 4. Set the screw and spring aside, and then lift the W17 Speaker Assembly from the front case.

- ◆ To install the W17 Speaker Assembly, reverse the preceding steps.

Note: Make sure you do not pinch the wires during reassembly.

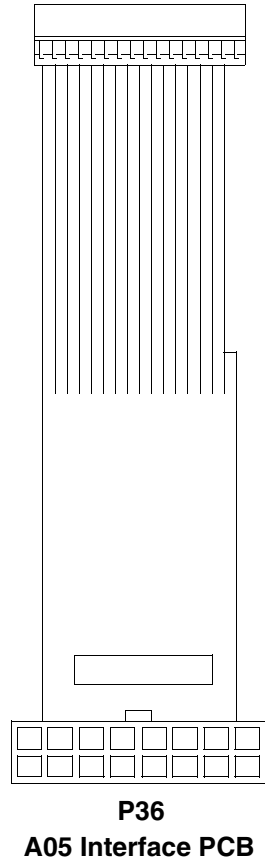
CAUTION!

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 the speaker, do not touch the speaker felt.

To continue, select from the [Summary of Replacement Procedures](#).

W18 LCD Assembly/Interface PCB Cable Replacement—LCD Devices

A11 LCD Assembly
P38



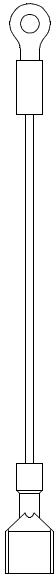
- ◆ To remove the W18 cable from the **front case**:
 1. **Disassemble the case.**
 2. Spread the connector retaining clips, and then eject the W18 cable from the A05 Interface PCB at J36.
 3. Place even pressure on the cable ribbon and ease the W18 cable out of the J38 edge connector on the A11 LCD Assembly.

- ◆ To install the W18 cable, reverse the preceding steps.

To continue, select from the **Summary of Replacement Procedures**.

W19 Printer Assembly/Chassis Ground Cable Replacement

chassis ground



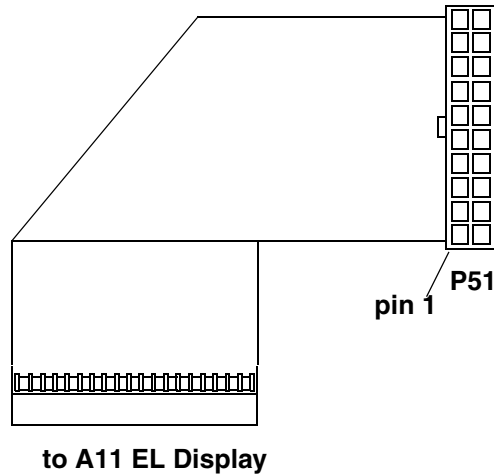
A12 Printer Assembly

- ◆ To remove the W19 cable from the **front case**:
 1. **Disassemble the case.**
 2. Remove the screw (230) securing the W19 cable to the A11 LCD Assembly Bracket (**42**) or 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.

To continue, select from the **Summary of Replacement Procedures**.

W32 EL Assembly/Interface PCB Cable Replacement



To remove the W32 cable from the **front case**:

1. **Disassemble the case.**
2. Press the connector retaining clip and disconnect the W32 cable from the A05 Interface PCB at J51.
3. Press the connector retaining clip and disconnect the W32 cable at the A11 EL Display connector.

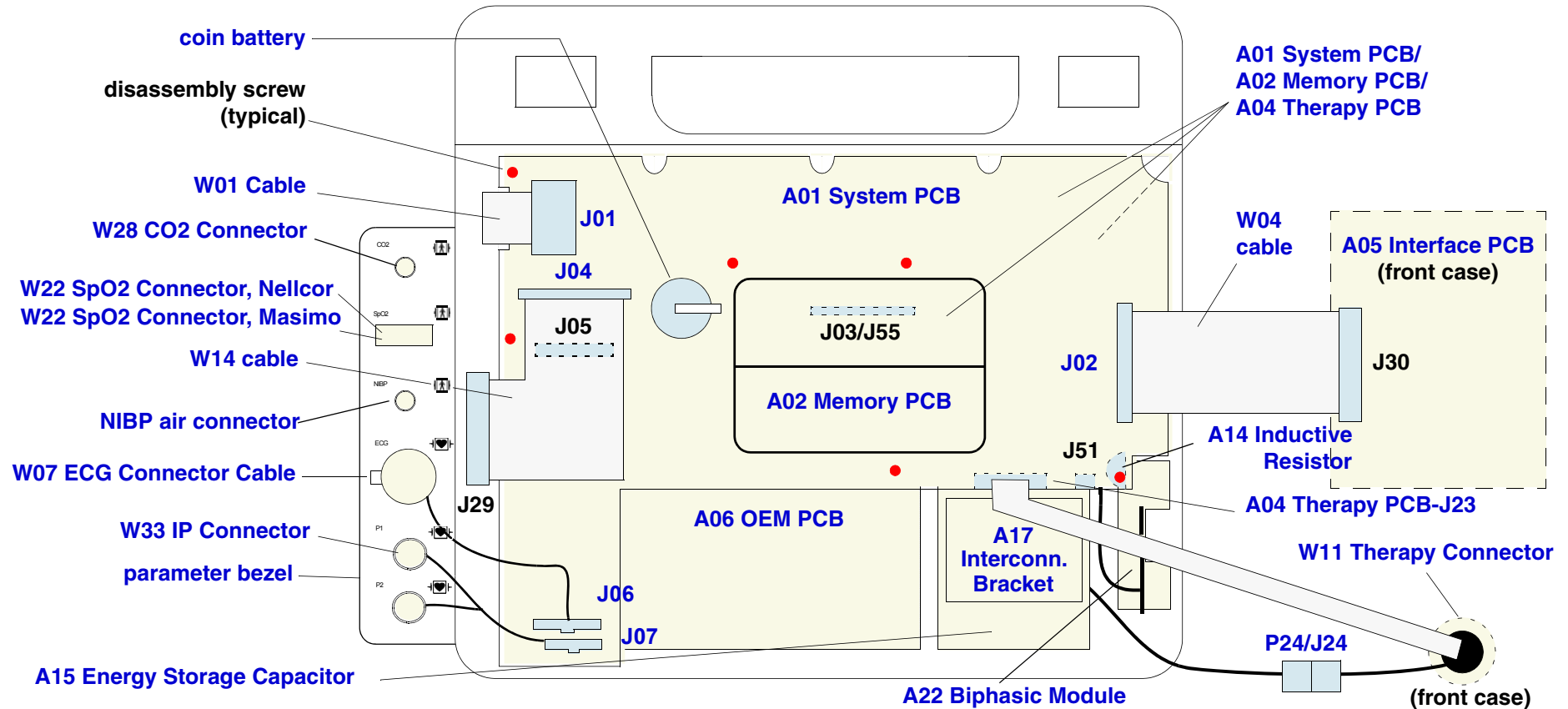
◆ To install the W32 cable, reverse the preceding steps.

To continue, select from the **Summary of Replacement Procedures**.

Inside Rear Case Diagrams

First View

Use this diagram after **disassembling the case**. For a list of replacement procedures, see the **Summary of Replacement Procedures**.

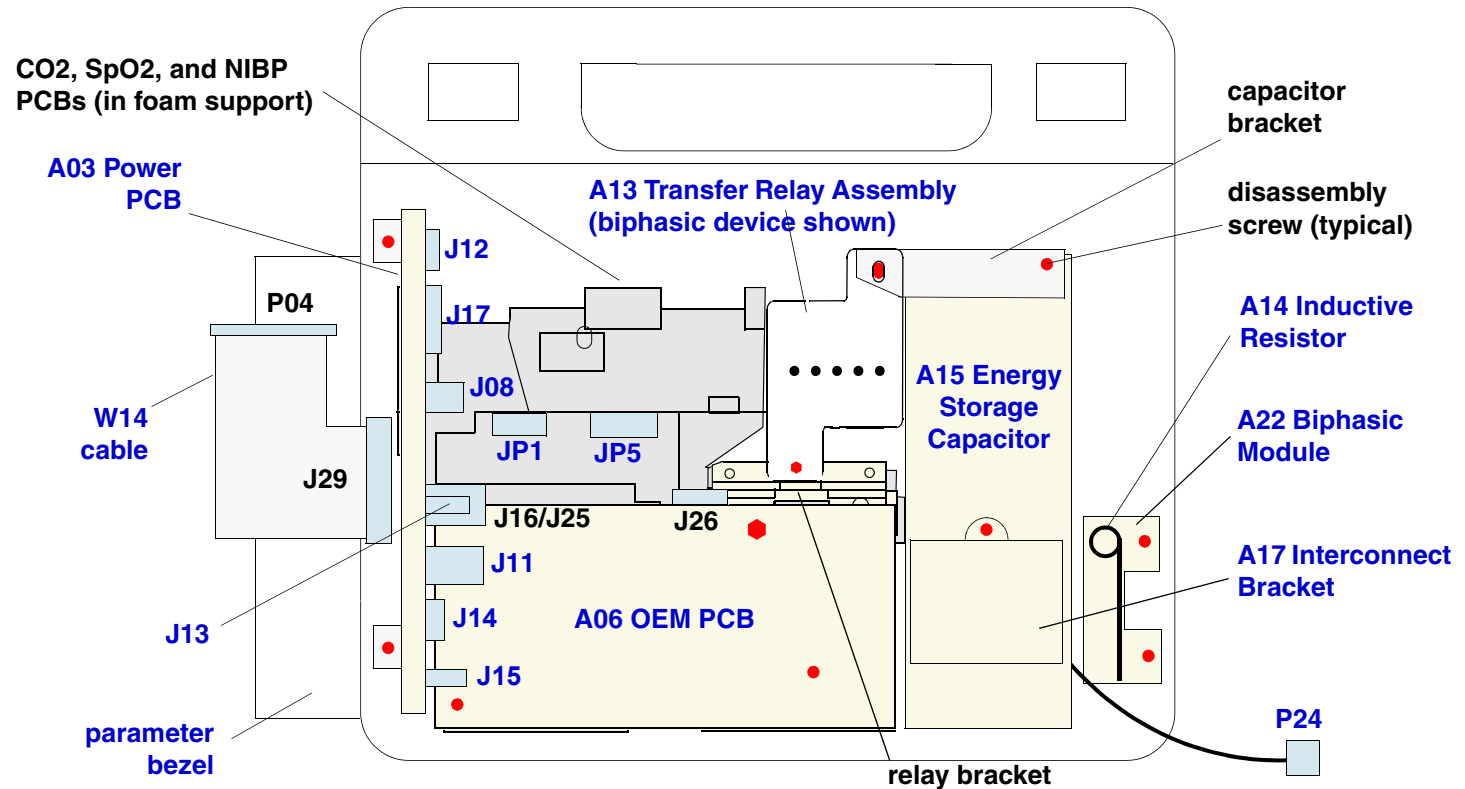


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Inside Rear Case Diagrams *(continued)*

A01 System/A02 Memory/A04 Therapy PCBs Removed

Use this diagram after **removing the A01 System/A02 Memory/A04 Therapy PCBs**. For a list of replacement procedures, see the **Summary of Replacement Procedures**.



(Continued on next page)

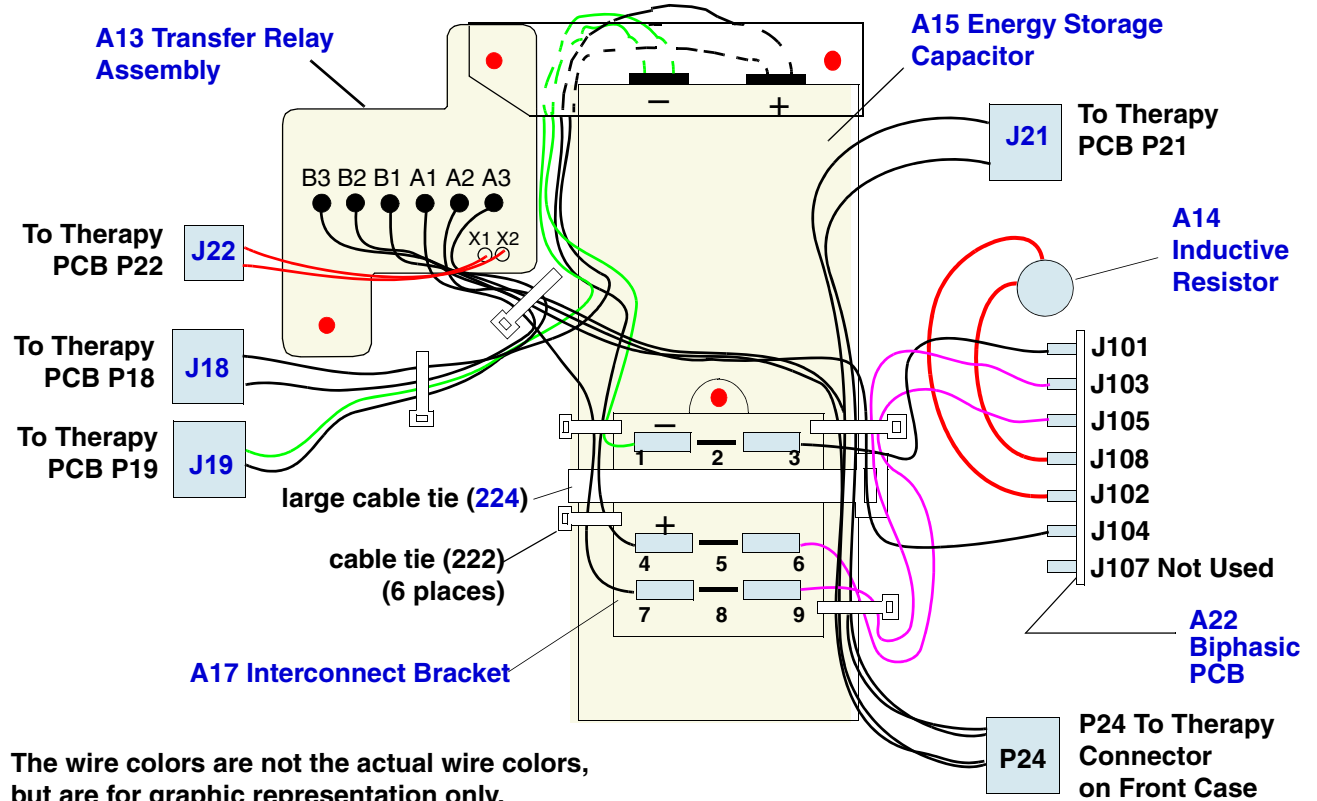
Inside Rear Case Diagrams *(continued)*

Page 3 of 4

Energy Transfer Detail Diagram – Biphasic Devices

Use this diagram to replace the A13 Transfer Relay Assembly, A22 Biphasic Module/A14 Inductive Resistor, A15 Energy Storage Capacitor, and A17 Interconnect Bracket in a biphasic device.

A17 Interconnect Bracket Chart	
Capacitor Neg 1	A17 Pin 1
Capacitor Pos 4	A17 Pin 4
A22 BTE J101	A17 Pin 3
A22 BTE J105	A17 Pin 6
A22 BTE J103	A17 Pin 9
Relay A1 (7)	A17 Pin 7
Relay B1 (104)	A22 BTE J104

*(Continued on next page)*

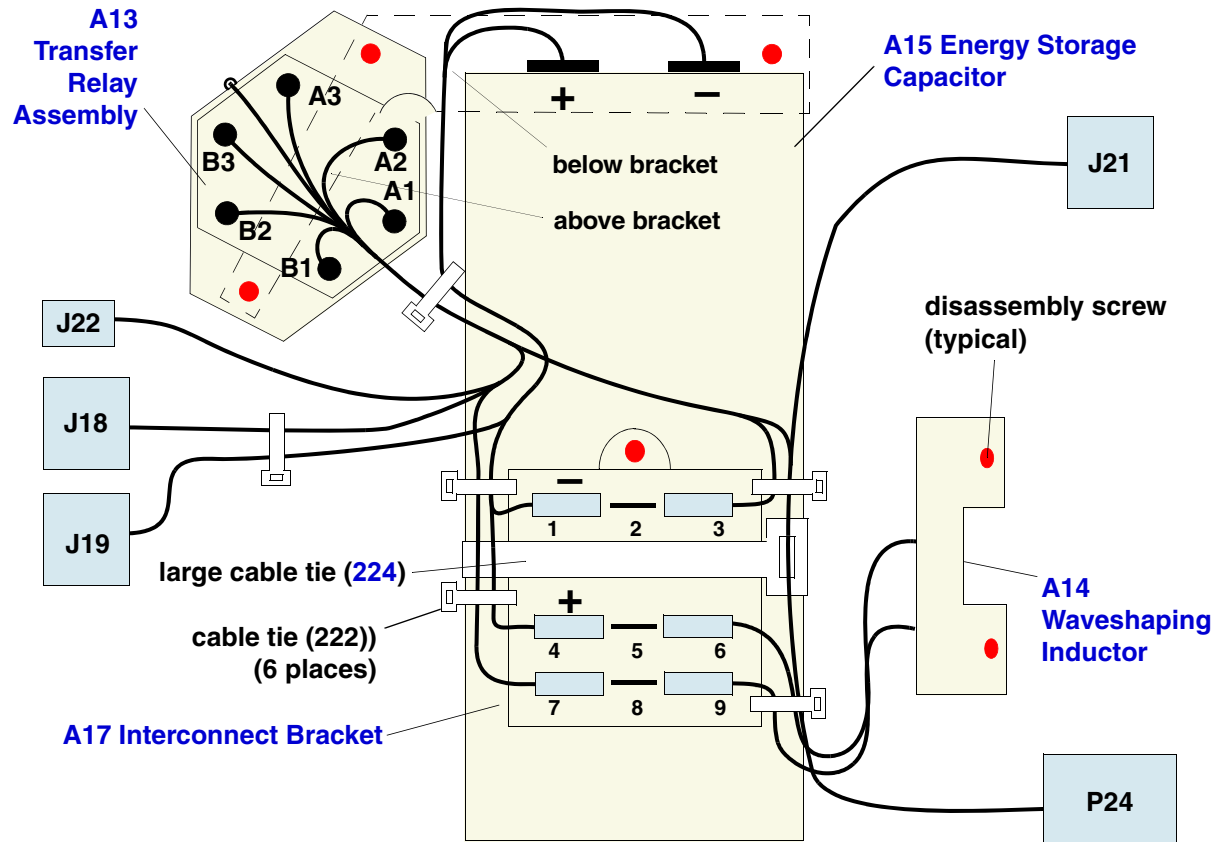
Inside Rear Case Diagrams *(continued)*

Page 4 of 4

Energy Transfer Detail Drawing – Monophasic Devices

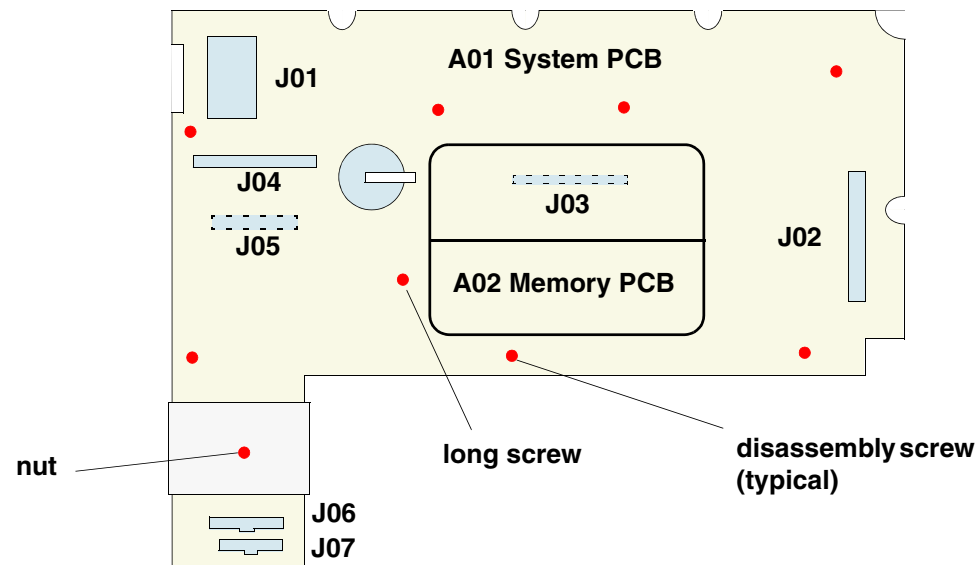
Use this diagram to replace the A13 Transfer Relay Assembly, A14 Waveshaping Inductor, A15 Energy Storage Capacitor, and A17 Interconnect Bracket in a monophasic device.

A17 Interconnect Bracket Chart	
Inductor 6	A17 Pin 6
Inductor 9	A17 Pin 9
Capacitor Neg 1	A17 Pin 1
Capacitor Pos 4	A17 Pin 4
Relay A1	A17 Pin 7
Relay B1	A17 Pin 3

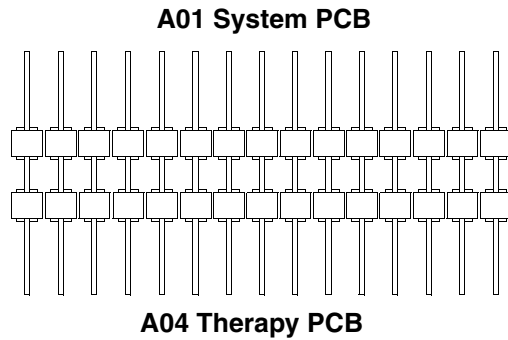


A01 System/A02 Memory PCB Assembly Replacement

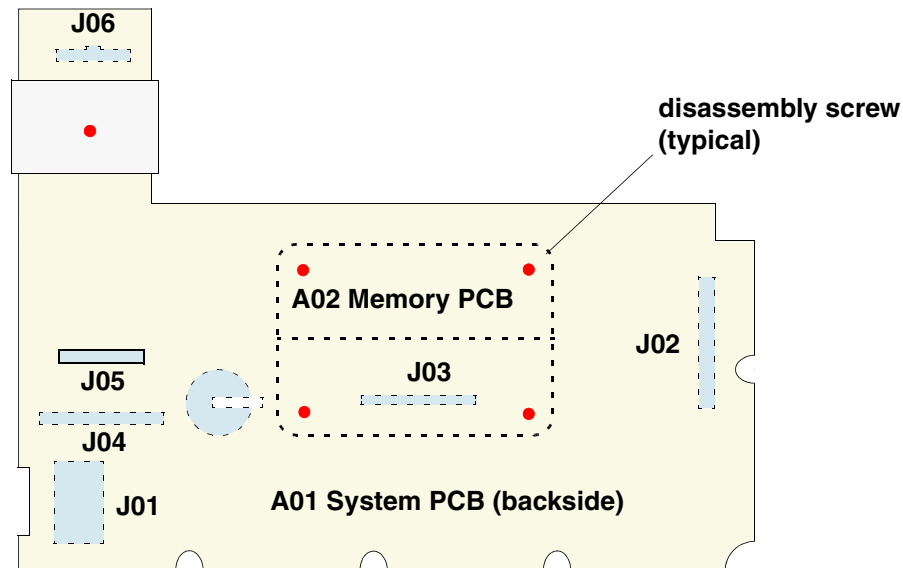
- ◆ To separate the A01 System/A02 Memory PCBs from the A04 Therapy PCB:
 1. **Disassemble the case.**
 2. Remove the **System/Memory/Therapy PCBs** as a unit.
 3. Place the System/Memory/Therapy PCBs with the A01 System PCB face up. Remove the seven screws (**230**) and one long screw (**296**) and nut (**216**). Make sure you loosen the screws and not the screw posts.



A01 System/A02 Memory PCB Assembly Replacement *(continued)* Page 2 of 4

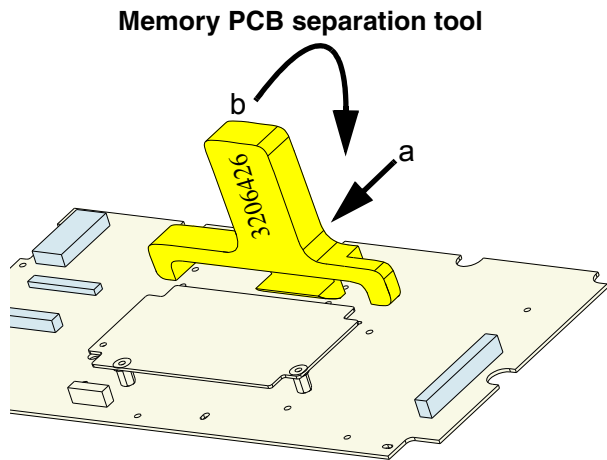


4. Gently lift the A01 System/A02 Memory PCBs up and away from the Therapy PCB. The two PCBs are linked by the W03 cable, which is a direct-connection contact assembly (see diagram at left).
5. Remove the W03 cable, and then set the Therapy PCB aside.
6. Turn the A01 System PCB over. On the back of the A01 System PCB, remove the four screws (230) securing the CPU shield (12). Note the orientation for later reassembly, and then remove the shield.



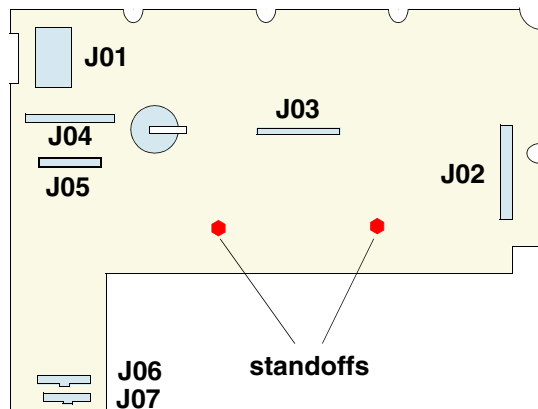
(Continued on next page)

A01 System/A02 Memory PCB Assembly Replacement *(continued)* Page 3 of 4



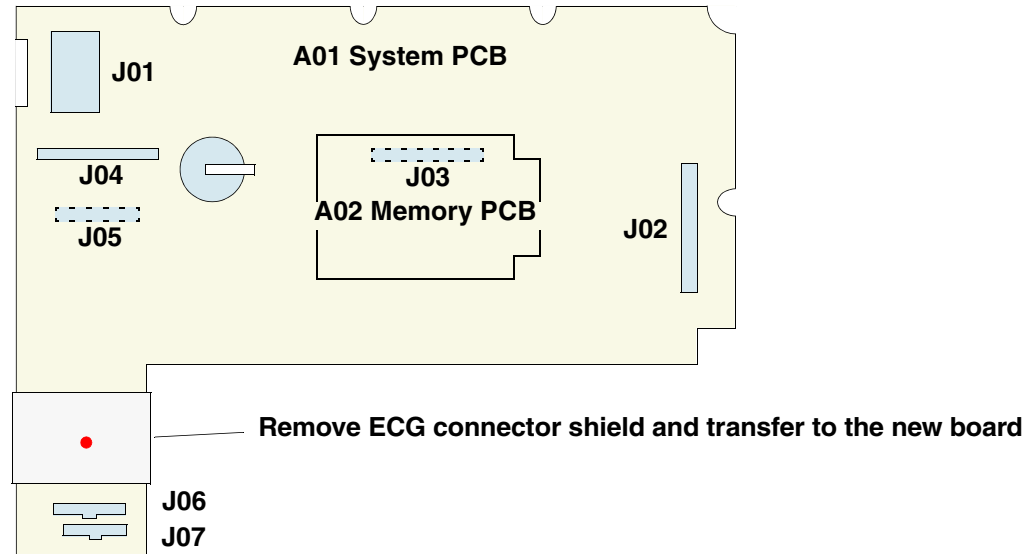
7. If replacement of the A01 System PCB only is required, turn the A01 System PCB face up. On the front of the A01 System PCB, remove the two screws (230) securing the A02 Memory PCB.
8. Using the A02 Memory PCB separation tool (MIN 3206426), slide the notched lever (a) under the edge of the A02 Memory PCB.
9. Rotate the handle of the separation tool downward (b) towards the A01 System PCB. The A02 Memory PCB will now be fully disconnected from the A01 System PCB at J03.
10. Remove the A02 Memory PCB standoffs (251) (if not already installed on the new A01 System PCB), and reuse them with the new assembly (System PCB replacement only).
11. Remove the ECG connector shield (if not already installed on the new A01 System PCB) (see diagram on the next page), and reuse it with the new assembly.

A01 System PCB



(Continued on next page)

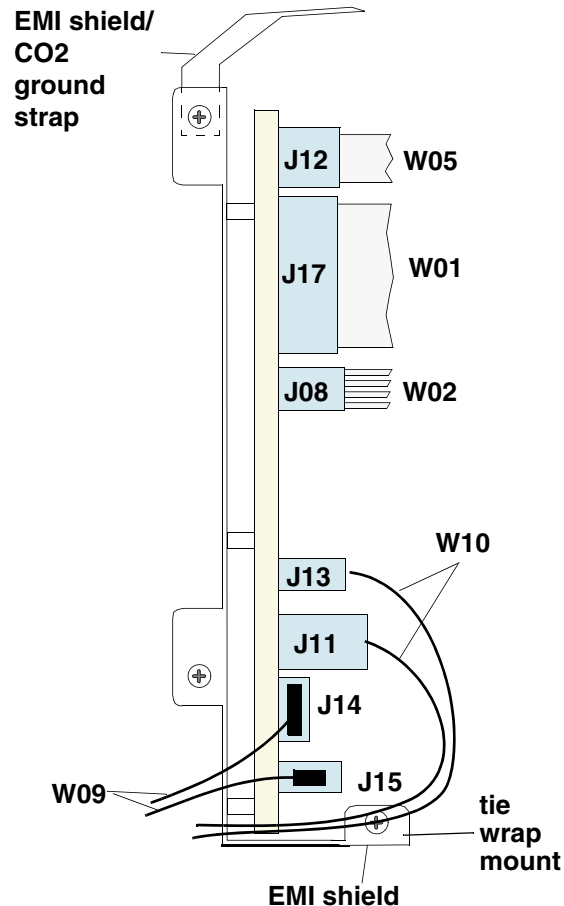
A01 System/A02 Memory PCB Assembly Replacement *(continued)* Page 4 of 4



- ◆ To install the A01 System/A02 Memory PCBs, reverse the preceding steps, observing the following.
 - Be sure to tighten the screws and nuts during reinstallation.
 - A01 System/A02 Memory PCBs replacement requires software and configuration updates. Contact Physio-Control representative for assistance.
 - After device reassembly, you must complete the TCP – Defibrillator Calibration procedure, because the defibrillator calibration constants are invalidated when you replace the A01 System PCB.

To continue, select from the [Summary of Replacement Procedures](#).

A03 Power PCB Replacement



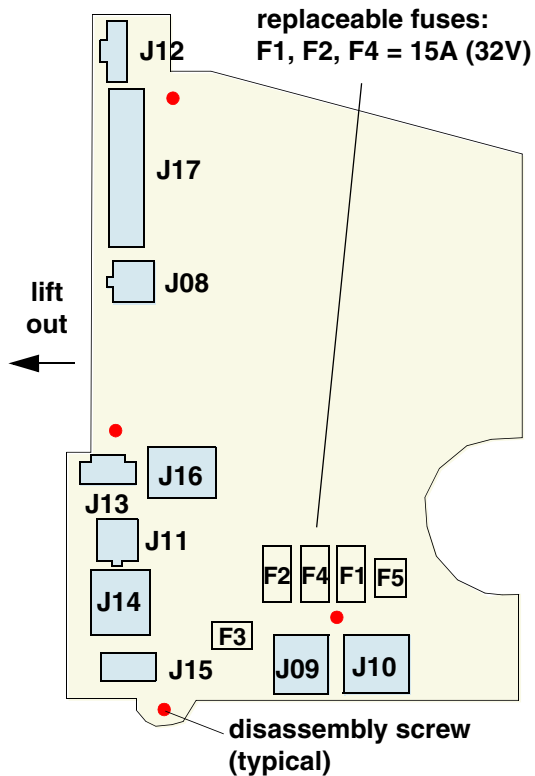
Some parts mentioned in this procedure are optional and may not apply to your device.

◆ To remove the A03 Power PCB from the **rear case**:

1. **Disassemble the case.**
2. Remove the **System/Memory/Therapy PCB assembly.**
3. Remove the **A06 OEM PCB.**
4. Disassemble the **A21 NIBP/A23 CO2 Module** (if OEM modules are installed).
5. Cut the cable tie securing the W10 cable wiring that connects to J11 and J13.
6. Disconnect the five connectors by pressing the associated retaining clips at J12 (W05 cable) (if not already disconnected), J13 and J11 (W10 cable), and J14 and J15 (W09 cable). Cables W01 and W02 were disconnected at the other end during the System/Memory/Therapy PCB removal.

(Continued on next page)

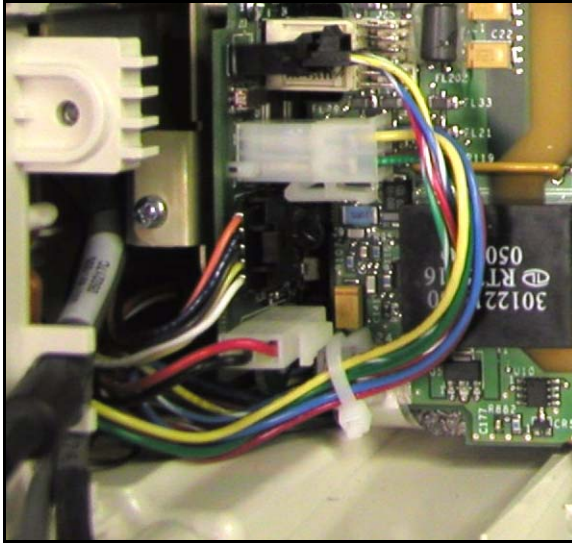
A03 Power PCB Replacement *(continued)*



7. Remove the two screws (230) securing the A03 Power PCB bracket (62) to the PC Card bracket (if not already removed).
 - For devices with an A23 CO2 Module: Under one of the screws securing the PC Card bracket are a washer, CO2 ground strap (370), and a strap to the EMI shield (150).
 - For devices with an A23 Mini-CO2 Module or no CO2 module: Remove the screw (230) and washer securing the EMI shield (150).
 8. Remove the bracket and PCB.
 9. Disconnect the two connectors by pressing the associated retaining clip and disconnecting J09 and J10 (W08 System Connector Cable).
 10. If you are replacing the A03 Power PCB, remove the four screws (230) securing the PCB to the mounting bracket, and then remove the PCB.
 - ◆ To replace an **A03 Power PCB fuse** (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.
1. Pull the old fuse straight out and away from the fuse holder.
 2. Push the new fuse (F1, F2, or F4) into the fuse holder.

(Continued on next page)

A03 Power PCB Replacement *(continued)*

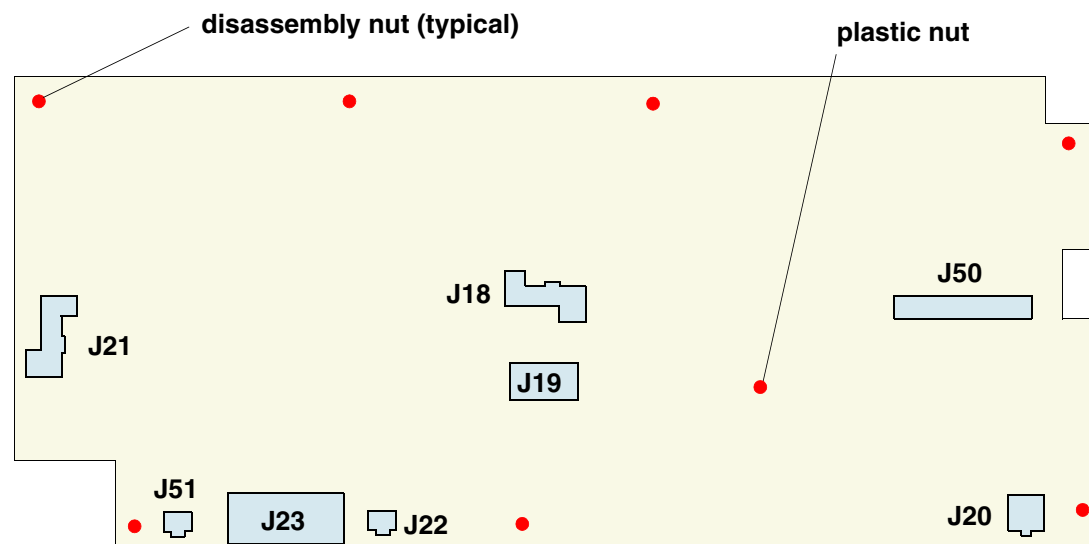


- ◆ To install the new A03 Power PCB, reverse the removal steps, observing the following:
 1. Connect the W08 System Connector Cable to J09 and J10 before mounting the A03 Power PCB in the case.
 2. If an A06 OEM PCB is not installed, the rear case EMI shield (**150**) goes between the screw, cable tie mount (**466**), and the PC Card bracket near J15.
If an A06 OEM PCB is installed:
 - EMI shield MIN 3010591-010 or earlier (or modified -010 version) will go between the A06 OEM PCB and the PC Card bracket.
 - EMI shield MIN 3010591-011 or later will go between the A06 OEM PCB and cable tie mount (**466**).
 3. Replace the cable tie (**222**) to group the W10 cable wiring, and route it through the cable tie mount (**466**), as shown in the **A03 Power PCB diagram**.

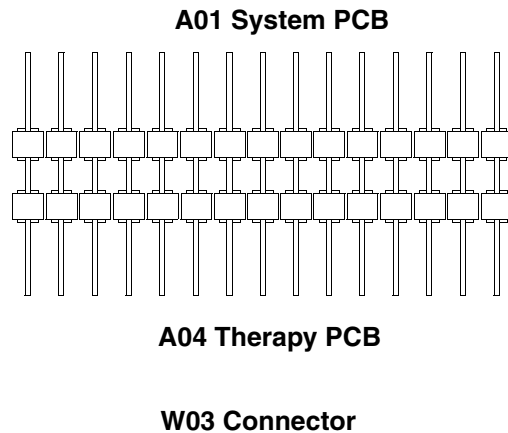
To continue, select from the [Summary of Replacement Procedures](#).

A04 Therapy PCB Replacement

- ◆ To remove the A04 Therapy PCB from the **rear case**:
 1. **Disassemble the case.**
 2. Remove the **System/Memory/Therapy PCBs** as a unit.
 3. Place the System/Memory/Therapy PCB unit on a protective surface with the 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.



A04 Therapy PCB Replacement *(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.

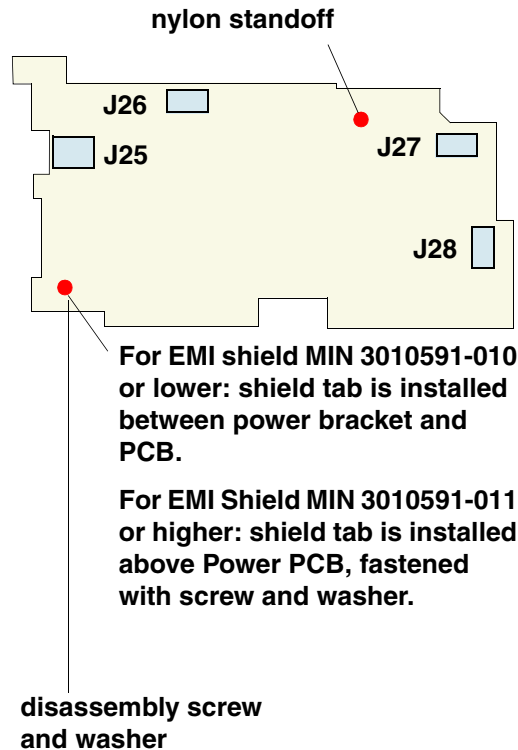
◆ To install the A04 Therapy PCB, reverse the preceding steps, observing the following.

- Lift the shield from the A04 Therapy PCB, and transfer to the new A04 Therapy PCB.
- Tighten screws and nuts during reinstallation.

Note: After device reassembly, you must complete the TCP - Defibrillator Calibration procedure, because the defibrillator calibration constants are invalidated when the A04 Therapy PCB is replaced.

To continue, select from the [Summary of Replacement Procedures](#).

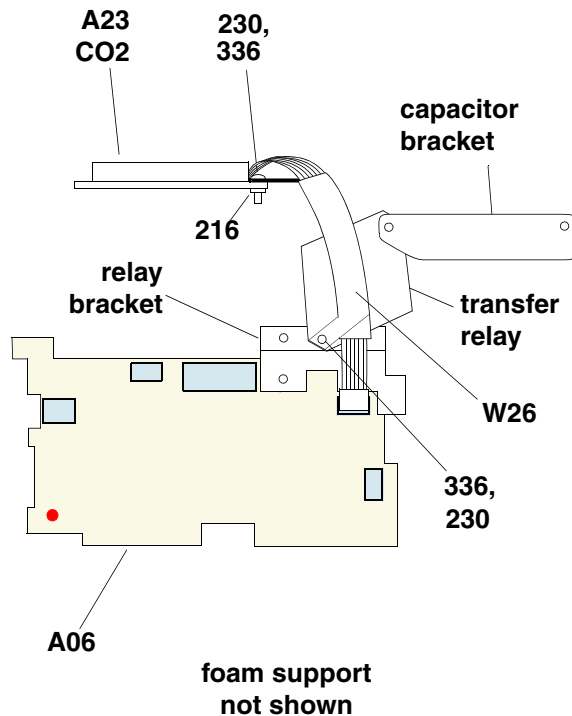
A06 OEM PCB Replacement



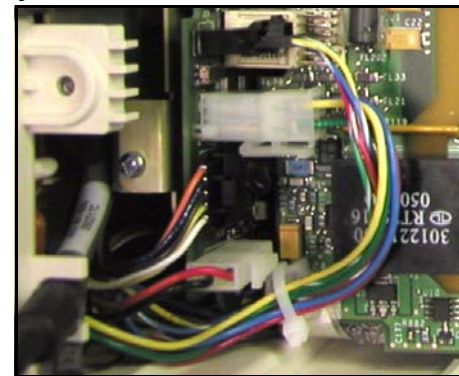
- ◆ To remove the A06 OEM PCB from the **rear case**:
 1. **Disassemble the case.**
 2. Remove the **System/Memory/Therapy PCB assembly.**
 3. Note the position, and then remove the option shield (**144**).
 4. Remove the nylon standoff (**248**).
 5. Remove the retaining clip (**228**). Disconnect P26 of the W21 cable from the A06 OEM PCB at J26A (if the SpO2 option is installed).
 6. Remove the retaining clip (**226**) and disconnect ribbon cable W27 from the A06 OEM PCB at J28 (if NIBP option is installed).
 7. Remove the retaining clip (**226**) and disconnect cable W26 from the A06 OEM PCB at J27 (if CO2 option is installed).
 8. Remove the screw (**230**) and washer (**336**), or screw and cable tie mount (**466**), from the lower-left corner.
 9. Remove the printer drain seal (**16**).
 10. Lift the right edge of the A06 OEM PCB upward slightly, and then slide the PCB to the right (toward the capacitor) to disengage the direct connection between the A06 OEM PCB at J25 and the A03 Power PCB at J16.
 11. Remove the A06 OEM PCB.

(Continued on next page)

A06 OEM PCB Replacement *(continued)*



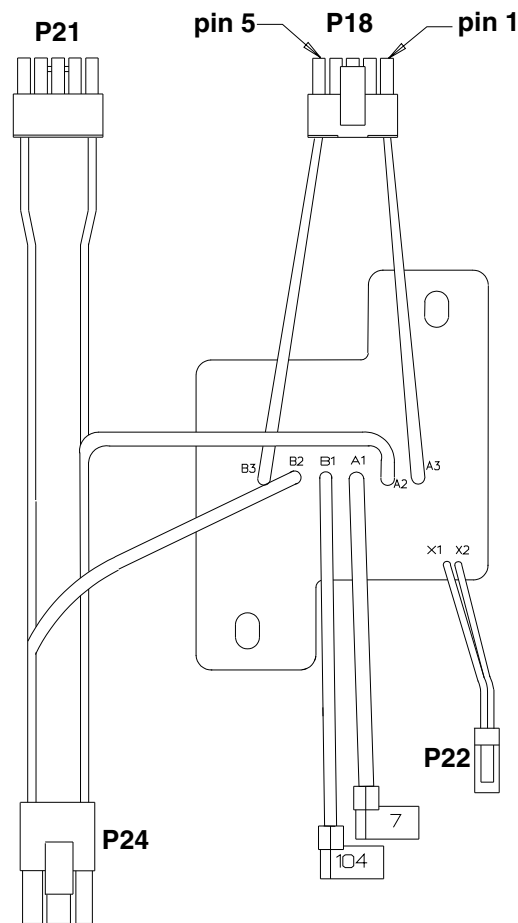
- ◆ To install the A06 OEM PCB, reverse the preceding steps, observing the following.
 - Make sure the EMI shield (**150**) ground tab is placed correctly (see diagram on pervious page).
 - Lift the tab at the upper left corner of the A06 OEM PCB over the ground clip on the power bracket, and then press down on the tab while sliding the A06 OEM PCB to the left to engage the direct connection to the A03 Power PCB at J16.
 - Fasten the lower left corner with the cable tie mount (**466**) and screw (**230**).
 - Secure the W10 cable to the cable tie mount using the cable tie (**222**).
- Note:** When installing the A06 OEM PCB, ensure that the option shield (**144**) partially covers the W01 System Cable to minimize wear.



To continue, select from the [Summary of Replacement Procedures](#).

A13 Transfer Relay Assembly Replacement—Biphasic Devices

Page 1 of 2



◆ To remove the A13 Transfer Relay Assembly from the **rear case** of a biphasic device:

1. **Disassemble the case.**
2. Remove the **System/Memory/Therapy PCB assembly.**
3. Remove the two screws (**230**) securing the capacitor bracket (**60**).
4. Cut the cable ties that secure the A13 Transfer Relay Assembly wiring (see the **Energy Transfer Detail Diagram**).
5. Remove the screw (**230**) securing the clear, plastic, high-voltage shield (**32**) to the A17 Interconnect Bracket.
6. Remove the spade terminal at A17 Interconnect Bracket position 7.
7. Remove the two screws (**230**) securing the A22 Biphasic Module bracket (**324**) to the rear case.
8. Partially lift the A22 Biphasic Module bracket and remove spade terminal connection J104.
9. 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)

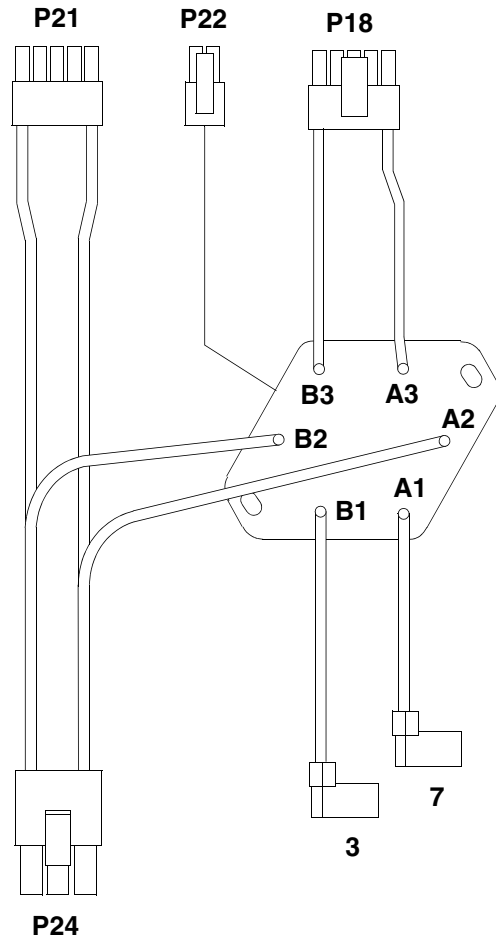
- ◆ To install the A13 Transfer Relay Assembly, reverse the steps on the previous page, observing the following:
 - The coil end of the A13 Transfer Relay Assembly fits in a recess in the case.
 - Note the spade terminal labels when connecting to the A17 Interconnect Bracket and A22 Biphasic PCB.
 - See the [Energy Transfer Detail Diagram](#) for terminal connections and cable tie locations.
 - After device reassembly, you must complete the TCP – Defibrillator Calibration procedure, because the defibrillator calibration constants are invalidated when you replace the A13 Transfer Relay Assembly.

To continue, select from the [Summary of Replacement Procedures](#).

A13 Transfer Relay Assembly Replacement—Monophasic Devices

To remove the A13 Transfer Relay Assembly from the rear case of a monophasic device:

1. **Disassemble the case.**
2. Remove the **System/Memory/Therapy PCB assembly.**
3. Remove the two screws (**230**) securing the capacitor bracket (**60**).
4. Cut the cable ties that secure the A13 Transfer Relay Assembly wiring (see the **Energy Transfer Detail Diagram**).
5. Remove the screw (**230**) securing the clear plastic high-voltage shield (**32**) to the A17 Interconnect Bracket.
6. Remove the two spade terminals from A17 Interconnect Bracket terminals 3 and 7.
7. Note the orientation of the P22 wiring for reinstallation, and then remove the A13 Transfer Relay Assembly.

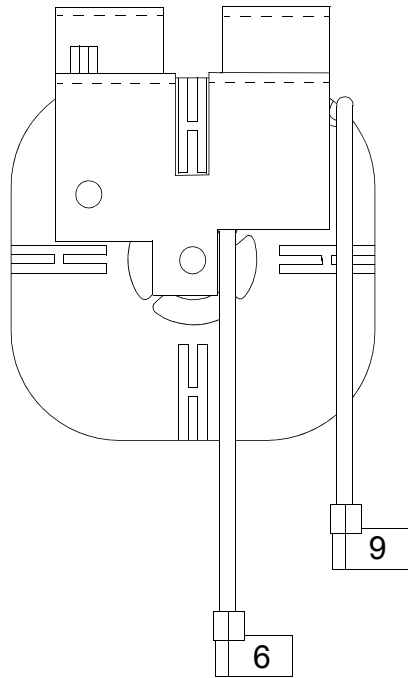


A13 Transfer Relay Assembly Replacement—Monophasic Devices (continued)

- ◆ To install the A13 Transfer Relay Assembly, reverse the preceding steps, observing 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 – Defibrillator Calibration procedure, because the defibrillator calibration constants are invalidated when you replace the A13 Transfer Relay Assembly.

To continue, select from the [Summary of Replacement Procedures](#).

A14 Waveshaping Inductor Replacement—Monophasic Devices



- ◆ To remove the A14 Waveshaping Inductor from the rear case (see the [Energy Transfer Detail Diagram](#)):
 1. **Disassemble the case.**
 2. Remove the **System/Memory/Therapy PCB assembly.**
 3. Remove the screw (230) securing the clear plastic high-voltage shield (32) to the A17 Interconnect Bracket.
 4. Cut the cable tie (222) that secures the A14 Waveshaping Inductor wiring.
 5. 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.
 6. Remove the two screws (230) securing the A14 Waveshaping Inductor to the rear case, and then remove the A14 Waveshaping Inductor with the bracket.
 7. Remove the screw (230) securing the inductor to the bracket (52).

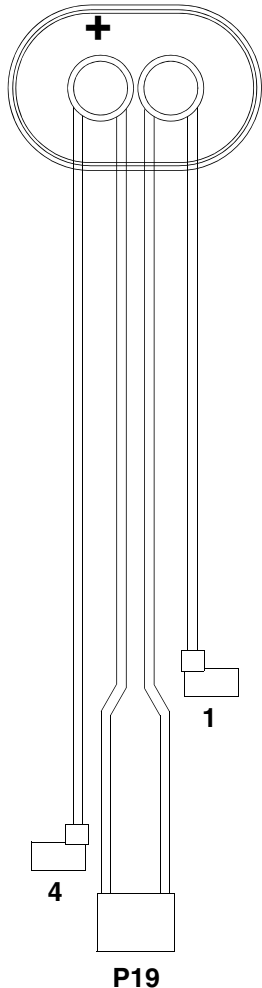
A14 Waveshaping Inductor Replacement—Monophasic Devices

(continued)

- ◆ To install the A14 Waveshaping Inductor, reverse the previous steps, observing the following:
 - Note the spade terminal labels when connecting to the A17 Interconnect Bracket.
 - After device reassembly, you must complete the TCP – Defibrillator Calibration procedure, because the defibrillator calibration constants are invalidated when you replace the A14 Waveshaping Inductor Assembly.

To continue, select from the [Summary of Replacement Procedures](#).

A15 Energy Storage Capacitor Replacement



- ◆ To remove the A15 Energy Storage Capacitor from the **rear case**:
 1. **Disassemble the case.**
 2. Remove the **System/Memory/Therapy PCB assembly.**
 3. Remove the two screws (**230**) securing the capacitor bracket (**60**).
 4. Cut the cable ties (**222**) that secure the capacitor wiring (see the **Energy Transfer Detail Diagram**).
 5. Remove the screw (**230**) securing the clear plastic high-voltage shield (**32**) to the A17 Interconnect Bracket.
 6. Remove all spade terminals from the A17 Interconnect Bracket terminals. A gripping tool may be necessary.
 7. Remove the two screws (**230**) securing the A22 Biphasic Module bracket (**324**) to the rear case.
 8. Partially lift the A22 Biphasic Module bracket, and remove the spade terminal connection J104. Remove the PCB with the bracket.
 9. Observing orientation, cut the large cable tie (**224**) securing the A15 Energy Storage Capacitor and A17 Interconnect Bracket to the rear case. Remove A15 and A17.

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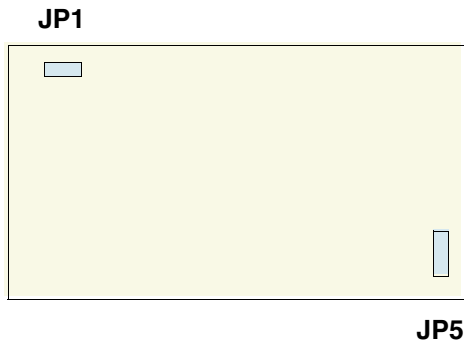
A15 Energy Storage Capacitor Replacement

(continued)

- ◆ To install the A15 Energy Storage Capacitor, reverse the preceding steps, observing 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.
 - After device reassembly, you must complete the TCP – Defibrillator Calibration procedure, because the defibrillator calibration constants are invalidated when you replace the A15 Energy Storage Capacitor.

To continue, select from the [Summary of Replacement Procedures](#).

A16 SpO2 PCB Replacement, Masimo Configuration



- ◆ To remove the A16 SpO2 PCB from the **rear case**:
 1. **Disassemble the case.**
 2. Remove the **System/Memory/Therapy PCB assembly.**
 3. Remove the **A06 OEM PCB.**
 4. 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) and washer (336) from the A13 Transfer 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 the **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.
 9. Turn the A16 SpO2 PCB over and remove the screw holding the W22 cable to the SpO2 PCB at JP1. Set the screw aside.
 10. Disconnect the W22 cable from the A16 SpO2 PCB at JP1. (Cable W21 at JP5 was disconnected at the other end during A06 OEM PCB removal.)

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A16 SpO2 PCB Replacement, Masimo Configuration *(continued)*

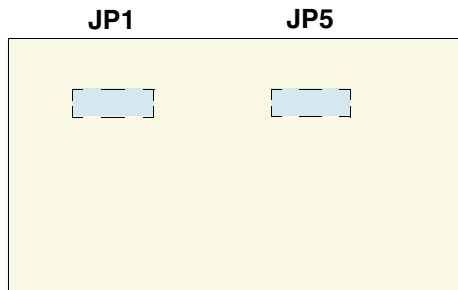
Page 2 of 2

- ◆ 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 the SpO2 PCB at JP1 and the W21 cable to the SpO2 PCB at JP5.

To continue, select from the [Summary of Replacement Procedures](#).

A16 SpO2 PCB Replacement, Nellcor Configuration



◆ To remove the A16 SpO2 PCB from the **rear case**:

1. **Disassemble the case.**
2. Remove the **System/Memory/Therapy PCB assembly.**
3. Remove the **A06 OEM PCB.**
4. 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**) and washer (**336**) from the A13 Transfer 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. Remove the retaining clip (**226**) and disconnect the W22 cable from the A16 SpO2 PCB at JP1 (J1 for the Nell-3 module). (Cable W21 at JP5 (J2 for the Nell-3 module) was disconnected at the other end during the A06 OEM PCB removal.)
9. Remove the upper foam support (**22**).
10. Lift out the A16 SpO2 PCB.

(Continued on next page)

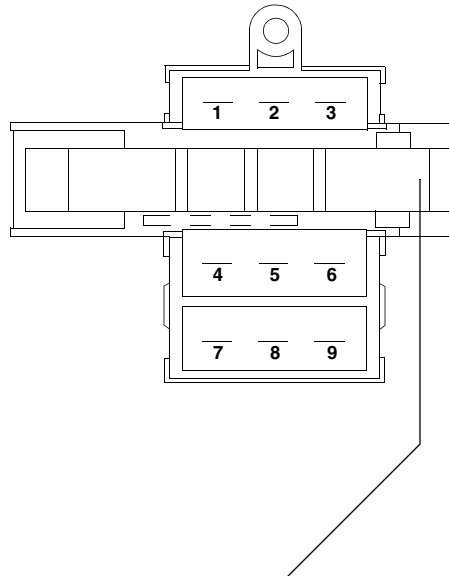
A16 SpO2 PCB Replacement, Nellcor Configuration *(continued)*

- ◆ To install the A16 SpO2 PCB, reverse the preceding steps.

Note: If the Nellcor MP-205 module is being replaced with a Nell-3 module, the **W22 SpO2 Connector Cable** and oximeter patent label (**288**) must also be replaced. The patent label is located in the battery well. The white label with black lettering is for the MP205, and the black label with white lettering is for the Nell-3.

To continue, select from the **Summary of Replacement Procedures**.

A17 Interconnect Bracket Replacement



head of the large cable tie
goes to this side of bracket

◆ To remove the A17 Interconnect Bracket from the rear case (see the [Energy Transfer Detail Diagram](#)):

1. **Disassemble the case.**
2. Remove the **System/Memory/Therapy PCB assembly.**
3. Remove the two screws (**230**) securing the capacitor bracket (**60**).
4. Remove the screw (**230**) securing the clear plastic high-voltage shield (**32**) to the A17 Interconnect Bracket.
5. Cut the cable ties (**222**) that secure the A17 Interconnect Bracket wiring.
6. Remove all spade terminals from the A17 Interconnect Bracket terminals. A gripping tool may be necessary.
7. Cut the large cable tie (**224**) securing the A17 Interconnect Bracket.

A17 Interconnect Bracket Replacement *(continued)*

- ◆ To install the A17 Interconnect Bracket, reverse the preceding steps, observing the following:
 - Feed the large tie through the left hole of the bracket, then through the rear case, then through the right hole of the bracket. Tighten so the tie collar fits in the bracket recess.

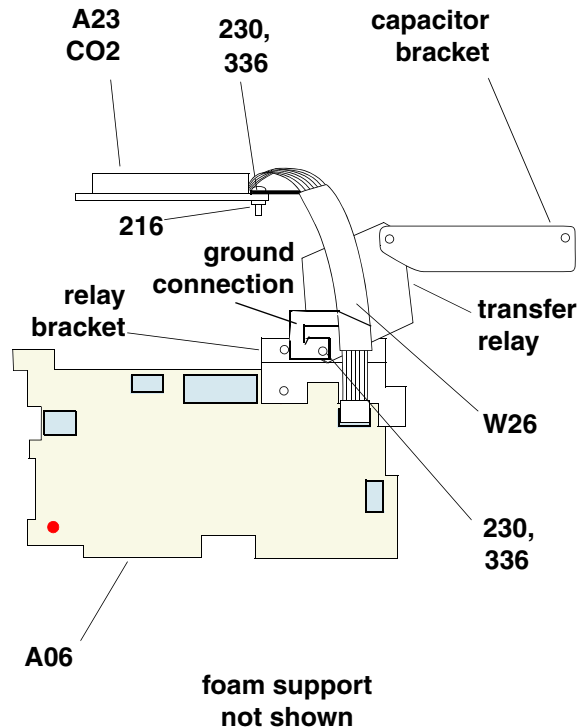


- Note the spade terminal labels when connecting to the A17 Interconnect Bracket.
- See the [Energy Transfer Detail Drawing](#) for cable tie locations.

To continue, select from the [Summary of Replacement Procedures](#).

A21 NIBP/A23 CO2 Module Replacement

Previous CO2 Module (MIN 3012140-005)



The A21 NIBP, A23 CO2, and A16 SpO2 PCBs are sandwiched between the lower foam (**20**) and upper foam (**22**). Some devices may not have all these options.

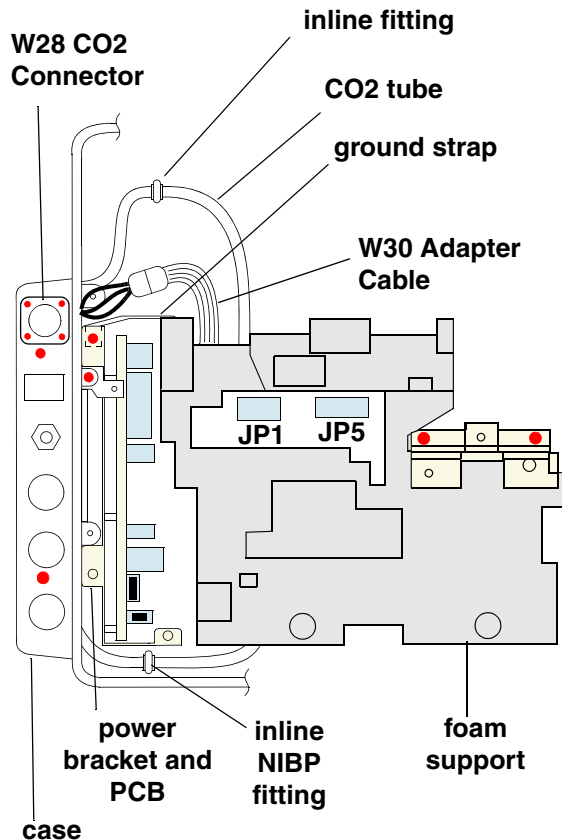
Note: For information about A23 Mini-CO2 module, See [A23 Mini-CO2 Module Functional Description](#). If repair will be replacing the A23 CO2 module with the Mini-CO2 module, the device system software required is 3011371-130 or greater. For software upgrade, contact Physio-Control for assistance.

◆ To remove the A21 NIBP and A23 CO2 PCBs as a unit (with the A16 SpO2 PCB) from the **rear case**:

1. **Disassemble the case.**
2. Remove the **System/Memory/Therapy PCB assembly**.
3. Remove the **A06 OEM PCB**.
4. If the W28 CO2 connector requires replacement or a new A23 Mini-CO2 module will be installed, perform **W28 CO2 Inlet Connector Cable Replacement**. For Mini-CO2 module disassembly, perform steps 4 and 5.

A21 NIBP/A23 CO2 Module Replacement *(continued)*

Previous CO2 Module (MIN 3012140-005)



5. Perform one of the following removal procedures to remove the upper support foam (22).
 - For Nellcor parameter bezel configurations, perform **A16 SpO2 PCB Replacement**, starting at step 4. If SpO2 is an option, set the SpO2 module aside.
 - For Masimo parameter bezel configurations, perform **A16 SpO2 PCB Replacement**, steps 4 through 8. If SpO2 is an option, keep the SpO2 module attached to W22 SpO2 cable. Set SpO2 module out of the way.
6. 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.)
7. Disconnect J17 on cable W01 from the A03 Power PCB and set aside.
8. Disconnect J12 on cable W05 from the A03 Power PCB.
9. Disconnect the W28 CO2 Inlet Connector Cable (coming from the bezel) from the W30 Adapter Cable.

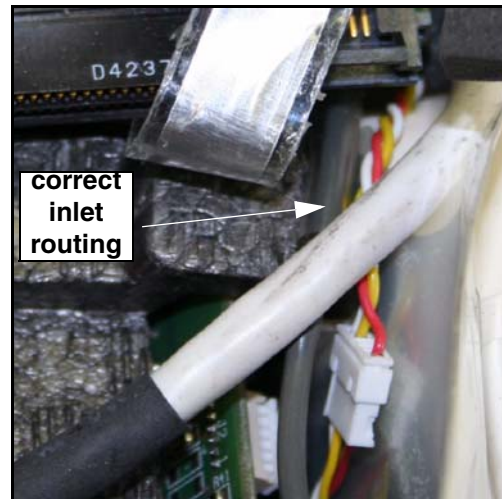
Note: The A23 Mini-CO2 module version does not use the W30 adapter cable. See **A23 Mini-CO2 Module Functional Description**.

Disconnect the W28 CO2 Inlet Connector Cable from the Mini-CO2 module at J2.

(Continued on next page)

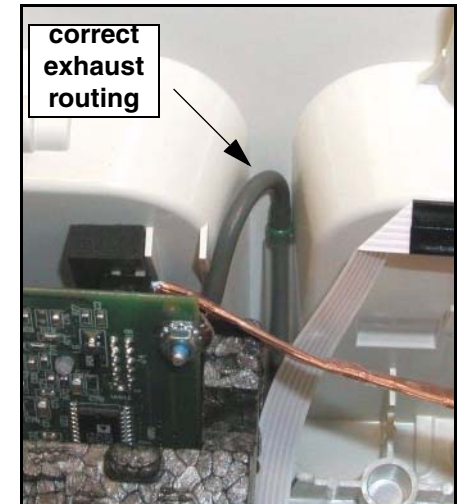
A21 NIBP/A23 CO2 Module Replacement *(continued)*

10. Remove the W28 CO2 Connector inlet tube from the routing clip (applicable only on older devices), and then disconnect it from the CO2 module tube at the barbed inline fitting.
11. Remove the screw (230) and washer (336) from the power bracket to free the ground strap (370) that is attached to the CO2 PCB (applicable on older versions only).
12. Lift the lower foam (20) and PCBs as a unit, far enough out of the case to unplug the black CO2 exhaust tube.
13. Remove the lower foam and PCBs from the rear case. Set the case aside.



**CO2 Module
(MIN 3012140-005)**

Inlet and exhaust
hose routing



(Continued on next page)

A21 NIBP/A23 CO2 Module Replacement *(continued)*

14. If replacing, lift the A21 NIBP or A23 CO2 Module out of the lower foam.

Caution!

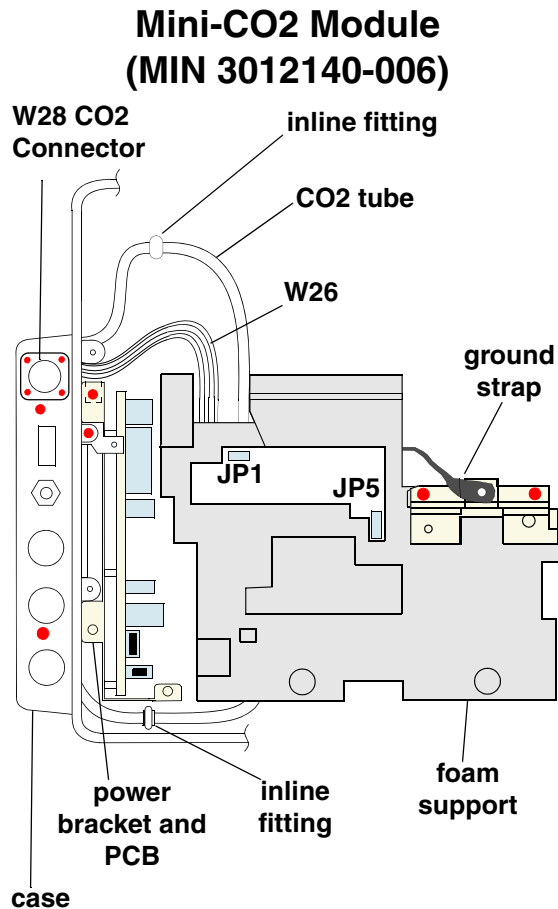
Possible Skin Burns. Do not open the CO2 scrubber device (part of the CO2 module). Scrubber material may cause caustic burns. If scrubber material comes in contact with skin, rinse the area of contact thoroughly with water. If scrubber material comes in contact with eyes, flush eyes with water for 15 minutes, and then seek immediate medical attention.

◆ To install the A21 NIBP, A23 CO2, and A16 SpO2 PCBs, reverse the preceding steps, observing the following:

- Replacement of an older CO2 module with the mini-CO2 module requires replacement of, or modification to, the **EMI shield**.
- The A23 CO2 PCB must have the W30 Adapter Cable (for older configurations) or W26 CO2 Power Cable (for Mini-CO2 module), and ground strap (370) connected to it prior to inserting it into the lower foam. Cable ends must be accessible for later access.

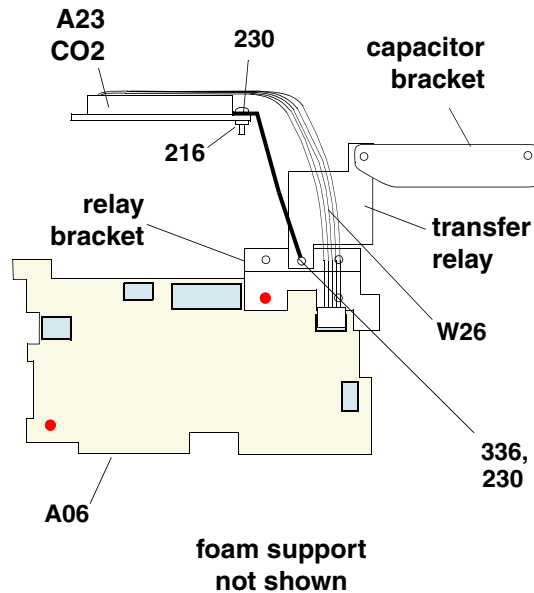
Note: New upper and lower foam supports are required when the Mini-CO2 module is installed as a replacement part.

- Place the CO2 ground strap between the relay bracket and relay. Secure it with a screw (230) and washer (336).
- Ensure the inlet and outlet tubing avoids pinch points.

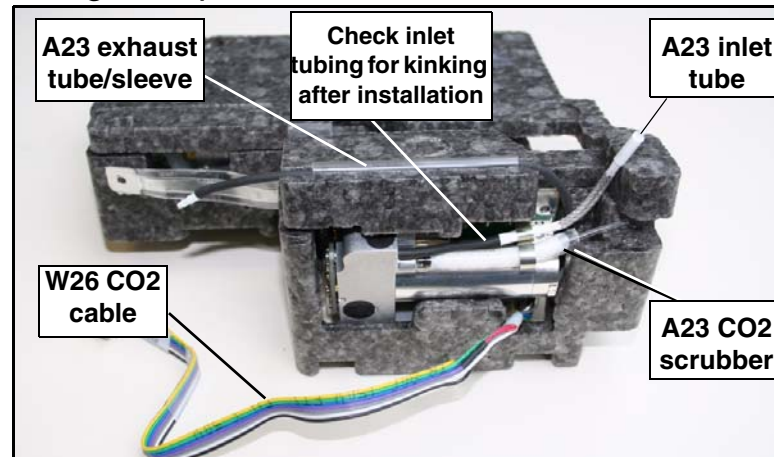


A21 NIBP/A23 CO2 Module Replacement *(continued)*

Mini-CO2 Module (MIN 3012140-006)



- **Mini-CO2 module** connection to W28 CO2 connector assembly prior to installing into lower foam is suggested. Use alcohol (IPA) to ease tubing connections. Press clear sleeve over module inlet fitting. Check that inlet tube isn't caught on retainer clip (next to J2). Route any excess inlet tubing back under bezel. Visually check that inlet or exhaust tubing isn't pinched or kinked between the module and the support foam. Route and center the exhaust tubing retaining sleeve in the groove of the upper support foam.
- The A21 NIBP PCB must have the W27 cable, retainer clip, and W29 tubing connected to it prior to inserting it into the lower foam. Route the W27 cable down the center of the PCB between the components, and then lay the W29 tubing on top of the W27 cable.

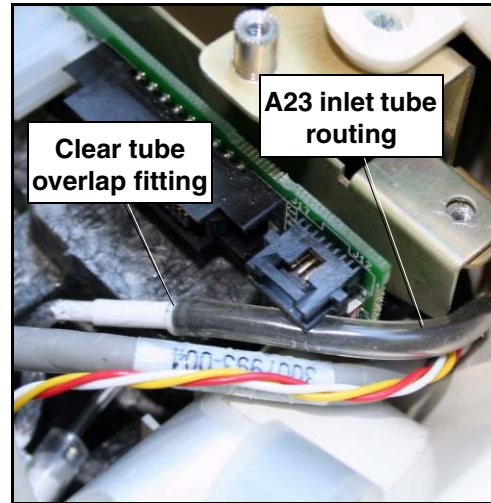


Mini-CO2 Module
(MIN 3012140-006)

correct routing of cable and tubing when placed in upper and lower support foam

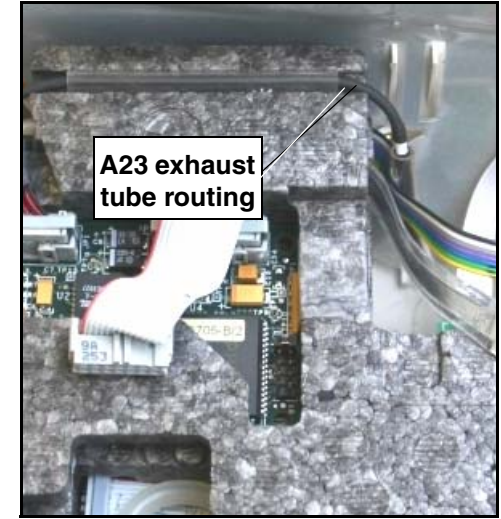
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A21 NIBP/A23 CO2 Module Replacement *(continued)*



Mini-CO2 Module
(MIN 3012140-006)

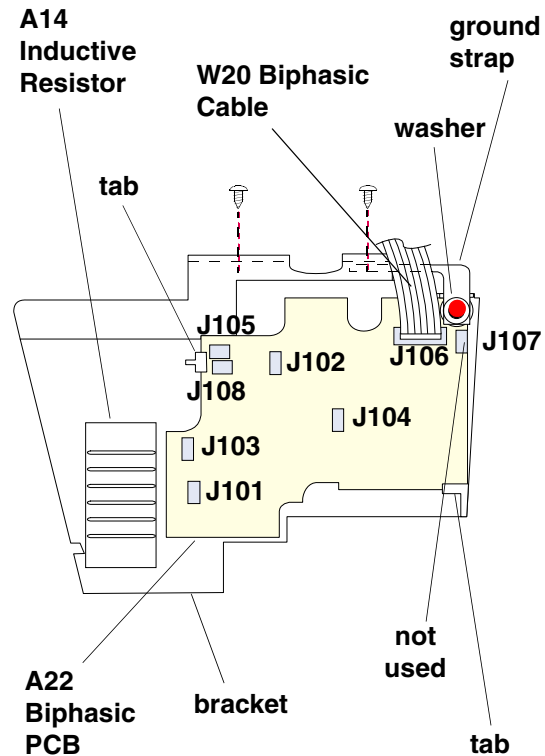
Inlet and exhaust
tubing routing



- The A21 NIBP PCB must also have two hex standoffs (251) on the far side, prior to inserting it into the lower foam.
- 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 must have a Nomex OEM PCB Shield (384) between it and the A06 OEM PCB.

To continue, select from the [Summary of Replacement Procedures](#).

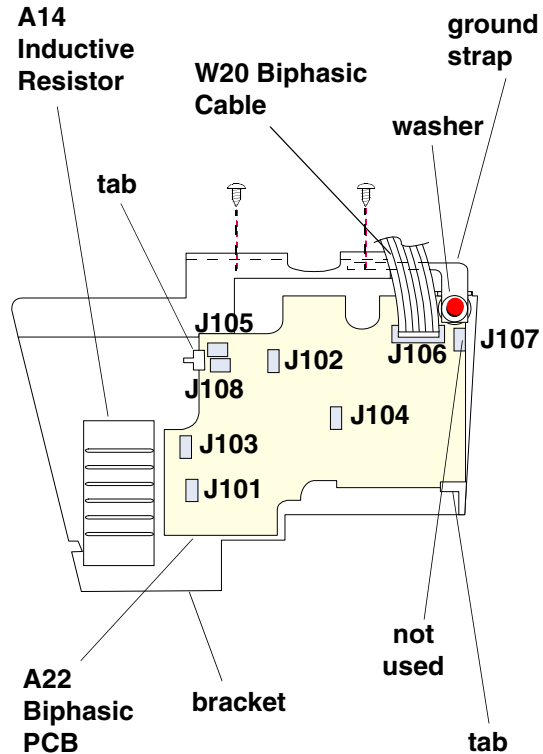
A22 Biphasic Module/A14 Inductive Resistor Replacement— Biphasic Devices



◆ To remove the A22 Biphasic PCB and/or the A14 Inductive Resistor from the **rear case**:

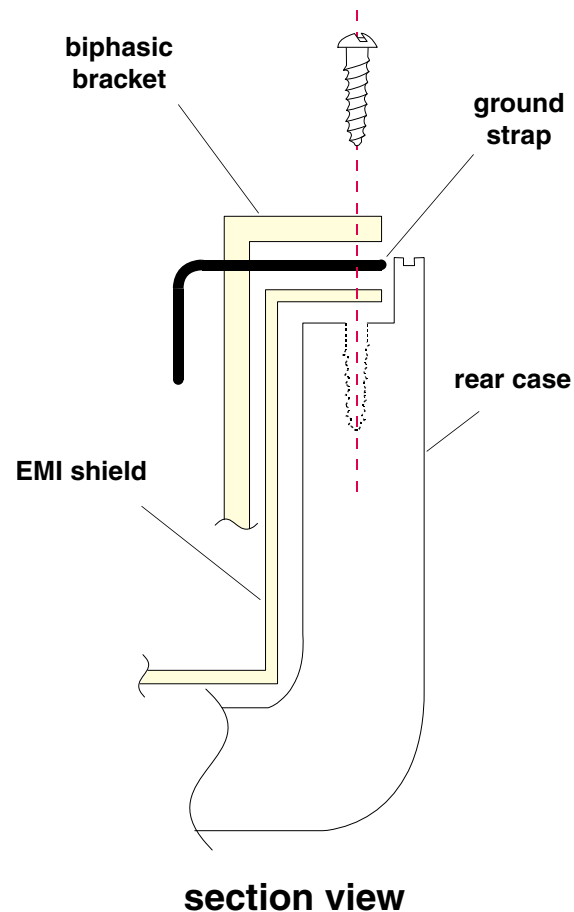
1. **Disassemble the case.**
2. Remove the **System/Memory/Therapy PCB assembly**.
3. Remove the screw (230) securing the clear plastic high-voltage shield (32) to the A17 Interconnect Bracket.
4. Cut the two cable ties (222) that secure the **A22 Biphasic PCB wiring**.
5. Remove the three spade terminal connections at the A17 Interconnect Bracket terminals 3, 6, and 9. A gripping tool may be necessary.
6. Remove the two screws (230) securing the A22 Biphasic PCB bracket (324) to the rear case.
7. Partially lift the A22 Biphasic PCB bracket and remove spade terminal connection J104. Remove the PCB with the bracket.

A22 Biphasic Module/A14 Inductive Resistor Replacement— Biphasic Devices (continued)



8. Remove spade terminals J102 and J108 from the PCB.
9. The **A14 Inductive Resistor** can be removed from the bracket prior to removing the PCB from the bracket. To remove the inductive resistor from the bracket (324), pull firmly. It will snap out.
10. To continue removing the A22 Biphasic PCB, remove the screw (230), washer (336), and ground strap (374) from the PCB.
11. 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.

A22 Biphasic Module/A14 Inductive Resistor Replacement— Biphasic Devices (continued)



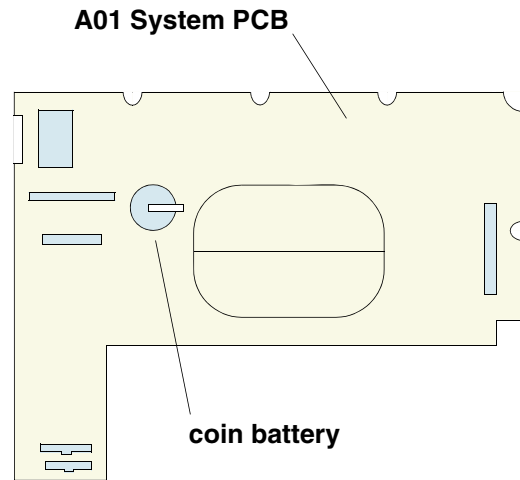
◆ To install the A22 Biphasic PCB, reverse the preceding steps, in addition to following these steps.

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.)
2. Install the **A14 Inductive Resistor** 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. See the **Energy Transfer Detail Diagram** for cable tie locations, and wire routing locations.

Note: The ground strap (**374**) must contact the EMI shield (see section view).

To continue, select from the **Summary of Replacement Procedures**.

Coin Battery Replacement



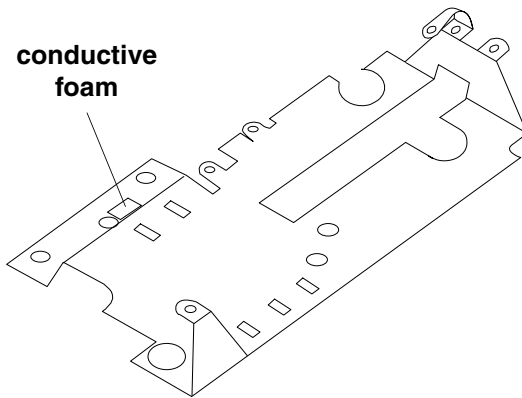
CAUTION!

Possible loss of device configuration. The coin battery powers the device real-time clock and 32kx8 NVRAM that stores the device configuration data, calibration data, and other important data. A depleted or removed coin battery will cause loss of calibration, serial number, manufacturing code, time and date. Contact your local Physio-Control representative for assistance when coin battery replacement is required.

- ◆ To replace the coin battery (**BT01**) on the A01 System PCB in the **rear case**:
 1. **Disassemble the case.**
 2. 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.
 3. Reentry of device data and calibration values will be required if 3 volts are not maintained across the coin battery holder during replacement.
 4. The coin battery is replaced every five years (see **Scheduled Replacement Items**). To verify the device configuration has not been lost, see **Verifying the Device Configuration**.

EMI Shield Replacement — Older Version, 3010591-04

EMI Shield MIN 3010591-04



- ◆ To remove an older EMI shield version (**150**) from the rear case:
 1. Remove the W10 Battery Cable (see **Monophasic** or **Biphasic** procedures).
 2. Lift the EMI shield up and out.

- ◆ To install the correct EMI shield, use the following guidelines:

- For a device **without CO2**, or with the **Mini-CO2 Module** installed, see the **current EMI shield** replacement instructions. (The current EMI shield is supplied as part of the rear case.) Observe the cable tie replacement when reinstalling.

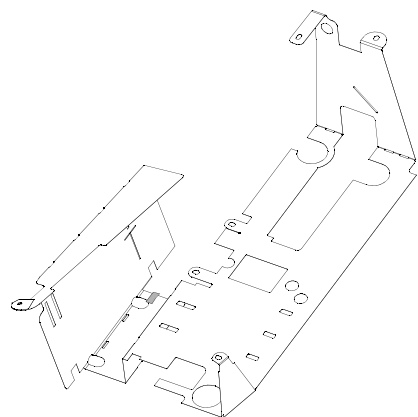
Note: EMI Shield MIN 3010591-04 cannot be used with the new Mini-CO2 Module. EMI Shield MIN 3010591-010 must be modified using shield patch MIN 3207817-000.

- For information about A23 Mini-CO2 module, See **A23 Mini-CO2 Module Functional Description**.
- For a device with the older **CO2 module** version installed, reverse the preceding removal procedure, using EMI shield MIN 3010591-010. Place the ground tab under the A06 OEM PCB. Observe the cable tie replacement when reinstalling.

To continue, select from the **Summary of Replacement Procedures**.

EMI Shield Replacement — Current Version

EMI Shield MIN 3010591-011

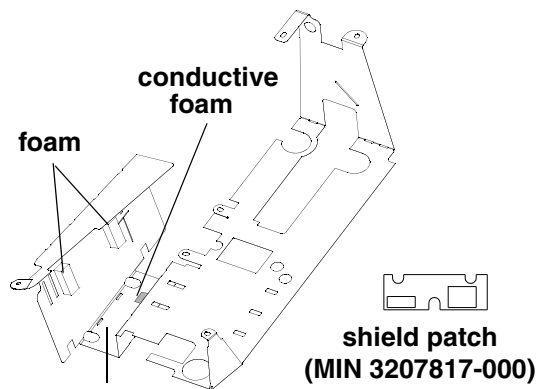


In the current EMI shield design, the shield is supplied as part of the rear case. Follow the instructions in [Rear Case Replacement](#) procedure to remove the EMI shield (**150**).

- ◆ To install the EMI shield, reverse the steps in the [Rear Case Replacement](#) procedure, using the following guidelines.

For devices with the Mini-CO2 Module option, installation of EMI Shield MIN 3010591-011 or modified EMI Shield MIN 3010591-010 is required.

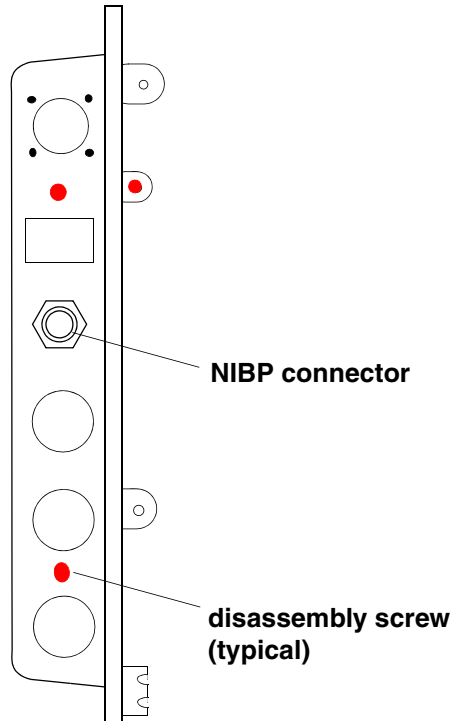
EMI Shield MIN 3010591-010



- To modify the -010 shield, remove the two pieces of foam and one piece of conductive foam from the EMI shield, and install shield patch MIN 3207817-000 by peeling off the adhesive liner and positioning it over the aluminum pad on the EMI shield where the conductive foam was removed. Use the protrusion in the rear case to line up the notches on the patch.
- To install a new -011 shield, pre-fold the shield, and install it from the right side, moving across to the left side, peeling off the adhesive liner as you go. Place the ground tab above the A06 OEM PCB, and fasten with the cable tie mount (466) and screw (230).

To continue, select from the [Summary of Replacement Procedures](#).

NIBP Connector Replacement



- ◆ To remove the NIBP connector from the parameter bezel (**rear case**):

Note: These steps include the A06 OEM PCB and all parameter bezel options. Your device may not have some of these options.

1. **Disassemble the case.**
2. Remove the **System/Memory/Therapy PCB assembly.**
3. Remove the **A06 OEM PCB.**
4. Remove the **parameter bezel.**
5. Remove the NIBP tube (**378**) from the NIBP connector (**346**).

Note: If the NIBP tube has been previously disconnected/reconnected from the fitting, 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**).

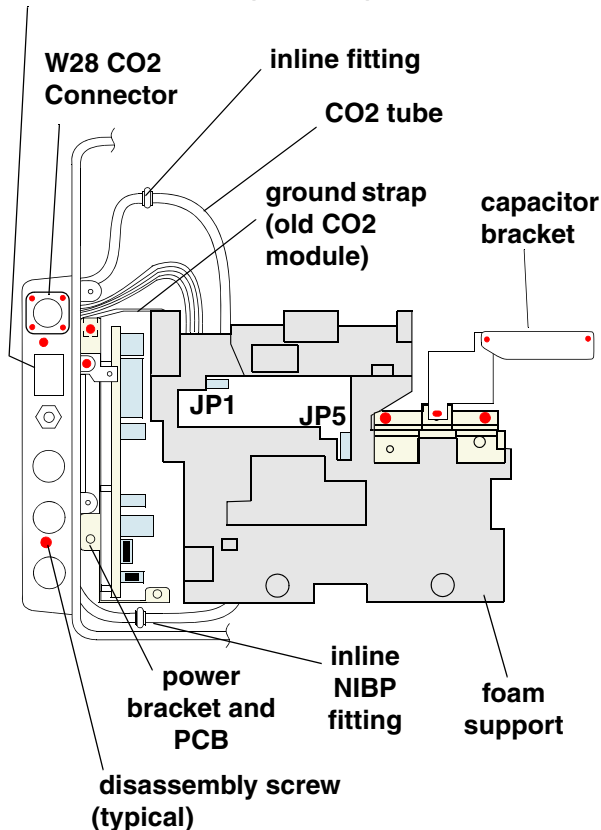
NIBP Connector Replacement *(continued)*

- ◆ To install the NIBP connector, reverse the preceding steps:
 - Install a new NIBP seal (**348**) with the NIBP connector (**346**).
 - If a new parameter bezel is installed, apply the parameter bezel label (**158**) to the new bezel front prior to installing the CO2 cover (**356**) onto the CO2 adapter.

To continue, select from the [Summary of Replacement Procedures](#).

Parameter Bezel Replacement, Masimo Configuration

Parameter Bezel (Masimo)



Note: This procedure includes the A06 OEM PCB and all options on the parameter bezel. Skip the steps pertaining to options your device does not have.

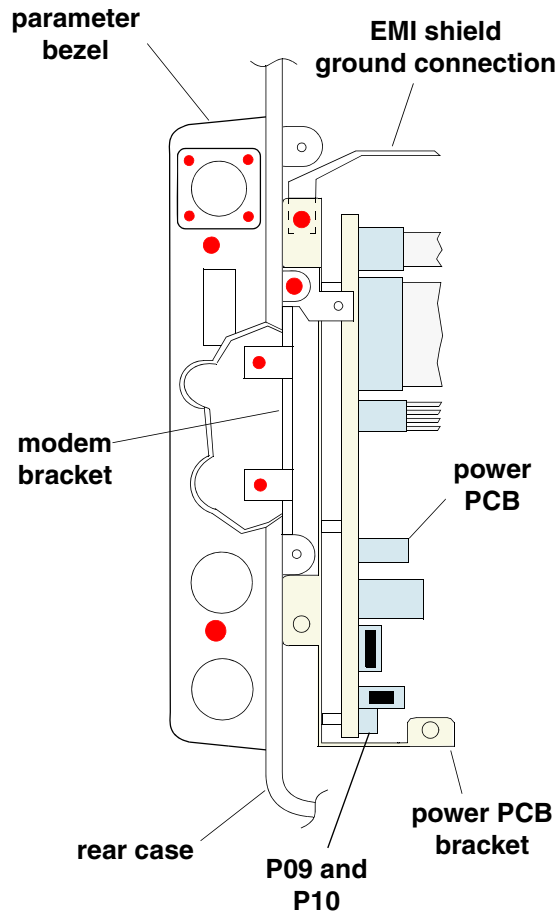
Note: To remove cables from the parameter bezel, select the appropriate cable replacement procedure from the [Summary of Replacement Procedures](#) (for example, [W01 Power/System PCB cable](#)).

◆ To remove the parameter bezel from the **rear case**:

1. **Disassemble the case.**
2. Remove the **System/Memory/Therapy PCB assembly**.
3. Remove the **A06 OEM PCB**.
4. Remove the A16 SpO2 PCB from the foam, and turn it over to remove the screw holding the W22 SpO2 Connector Cable to the A16 SpO2 PCB at JP1. Set the screw aside.
5. Disconnect the W22 SpO2 Connector cable from A16 SpO2 PCB at JP1.
6. Remove the two screws (**230**) securing the capacitor bracket (**60**).
7. Remove the screw (230) and washer (336) from the A13 Transfer Relay Assembly (relay bracket).
8. Move the relay out of the way.

(Continued on next page)

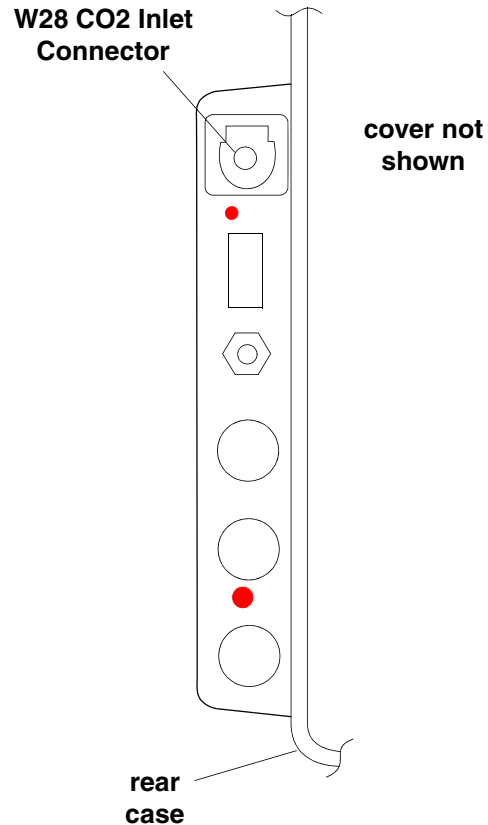
Parameter Bezel Replacement, Masimo Configuration *(continued)*



9. Remove the two screws (230) securing the relay bracket (46) to the case, and then remove the bracket.
10. Lift off the upper foam support (22).
11. Disconnect the W01 Power/System PCB cable from the A03 Power PCB at J17, and set it aside.
12. Disconnect the W05 cable from the A03 Power PCB at J12.
13. Disconnect the W28 CO2 Connector cable end from the W30 Adapter Cable (if old CO2 module is installed) or from the new A23 Mini-CO2 Module.
14. Disconnect the W28 CO2 inlet tube from the barbed fitting connected to the A23 CO2 module.
15. Locate the W28 CO2 Connector cover (356) on the bezel and remove it.
16. Lift one corner of the parameter bezel label (158) and peel it off.
17. Remove the two screws (462) securing the parameter bezel to the rear case. Remove the screw (462) securing it to the modem bracket (48).
18. Pull the parameter bezel up and out just enough to unscrew the two screws (230) attaching the modem bracket to the rear case.
19. Disconnect the NIBP PCB tube (378) at the NIBP fitting between the parameter bezel and the A21 NIBP module.

(Continued on next page)

Parameter Bezel Replacement, Masimo Configuration *(continued)*



20. 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.

21. Lift out the parameter bezel from the rear case.

If you are installing a new parameter bezel, transfer the following items from the old parameter bezel to the new parameter bezel, as they apply to your device:

- **W07 ECG Connector cable** (use a new seal)
- **W22 SpO2 Connector cable** (use a new seal)
- **NIBP tube, connector, nut** (use a new seal)
- **W28 CO2 Inlet Connector Cable** (use a new seal)
- **W33 Invasive Pressure Connector** (use new seals)

(Continued on next page)

Parameter Bezel Replacement, Masimo Configuration *(continued)*

- ◆ To install the parameter bezel, reverse the preceding steps, observing the following:
 - Clean away any adhesive residue on the parameter bezel with isopropyl alcohol.
 - 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.
 - Devices without CO2: Place a label spacer ([386](#)) into the CO2 recess in the bezel before applying the label.

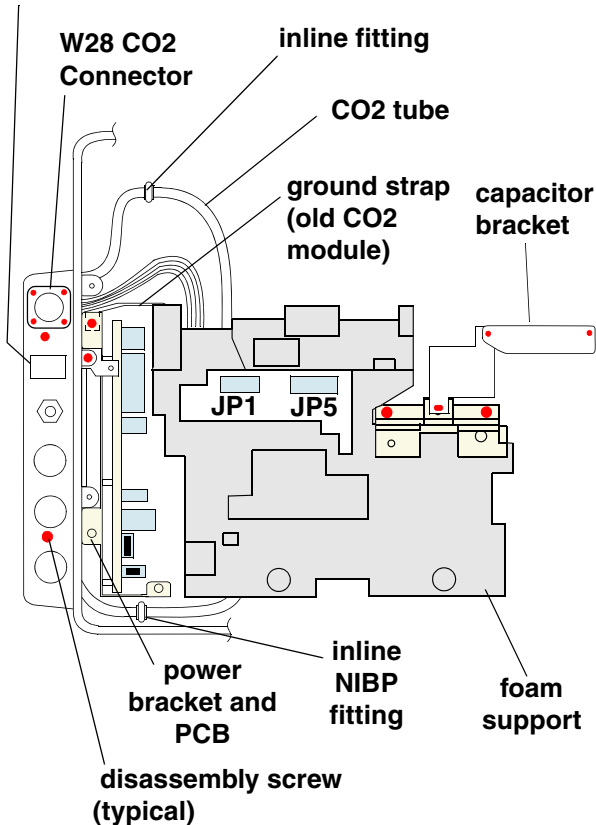
CAUTION!

Possible moisture leakage. Visually inspect the mating surfaces between the parameter bezel and the rear case before and after screwing it down to ensure they are even.

To continue, select from the [Summary of Replacement Procedures](#).

Parameter Bezel Replacement, Nellcor Configuration

Parameter Bezel (Nellcor)



Note: Two types of Nellcor SpO₂ modules were available in the LIFEPAK 12, the current module NELL-3 and previous module MP-205. The NELL-3 module requires a different W22 SpO₂ Connector Cable and software version 3011371-130 or greater. For software upgrade, contact Physio-Control for assistance.

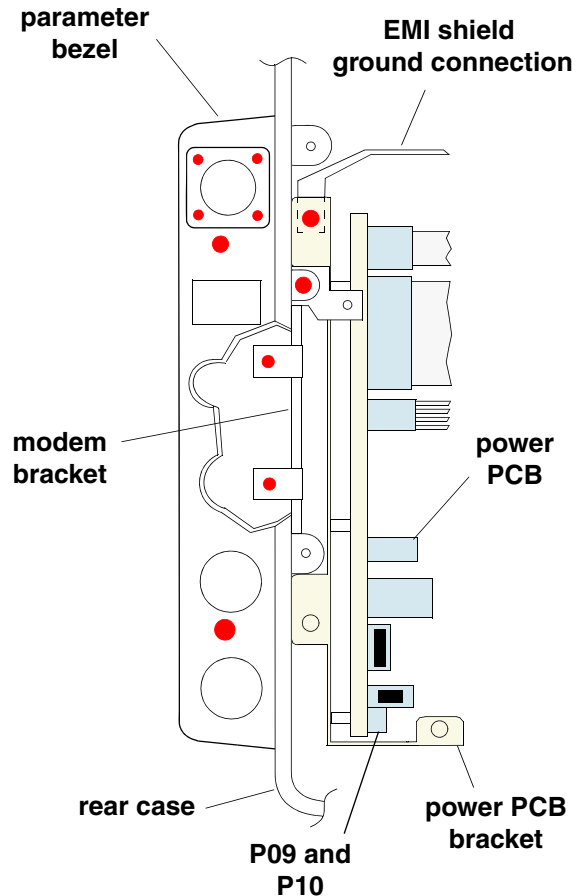
This procedure includes the A06 OEM PCB and all options on the parameter bezel. Skip the steps that pertain to options your device does not have.

◆ To remove the parameter bezel from the **rear case**:

1. **Disassemble the case.**
2. Remove the **System/Memory/Therapy PCBs.**
3. Remove the **A06 OEM PCB.**
4. Remove the retaining clip (**226**) and disconnect the W22 SpO₂ Connector Cable from the A16 SpO₂ PCB at J1 (JP1 for Nellcor MP-205).
5. Remove the two screws (**230**) securing the capacitor bracket (**60**).
6. Remove the screw (**230**) and washer (**336**) from the A13 Transfer Relay Assembly (relay bracket).
7. Move the relay out of the way.
8. Remove the two screws (**230**) securing the relay bracket (**46**) to the case, and then remove the bracket.

(Continued on next page)

Parameter Bezel Replacement, Nellcor Configuration *(continued)*



9. Lift off the upper foam support (22).
10. Disconnect the W01 Power/System PCB cable from the A03 Power PCB at J17, and set it aside.
11. Disconnect the W05 Power/Contact PCB cable from the A03 Power PCB at J12.
12. Disconnect the W28 CO2 Inlet Connector cable end from the W30 Adapter Cable (if old CO2 module is installed) or from the new A23 Mini-CO2 Module.
13. Disconnect the W28 CO2 inlet tube from the barbed fitting connected to the A23 CO2 module.
14. Locate and remove the W28 CO2 Inlet Connector cover (356) on the bezel.
15. Lift one corner of the parameter bezel label (158) and peel it off.
16. Remove the two screws (462) securing the parameter bezel to the rear case. Remove the screw (462) securing it to the modem bracket (48).
17. Pull the parameter bezel up and out just enough to unscrew the two screws (230) attaching the modem bracket to the rear case.
18. Disconnect the NIBP PCB tube (378) at the NIBP fitting between the parameter bezel and the A21 NIBP module.

(Continued on next page)

Parameter Bezel Replacement, Nellcor Configuration *(continued)*

19. 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.

20. Lift out the parameter bezel from the rear case.

If you are installing a new parameter bezel, transfer the following items from the old parameter bezel to the new parameter bezel, as they apply to your device:

- **W07 ECG Connector cable** (use a new seal)
- **W22 SpO2 Connector cable** (use a new seal)
- **NIBP tube, connector, nut** (use a new seal)
- **W28 CO2 Inlet Connector** (use a new seal)
- **W33 Invasive Pressure Connector** (use new seals)

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Parameter Bezel Replacement, Nellcor Configuration *(continued)*

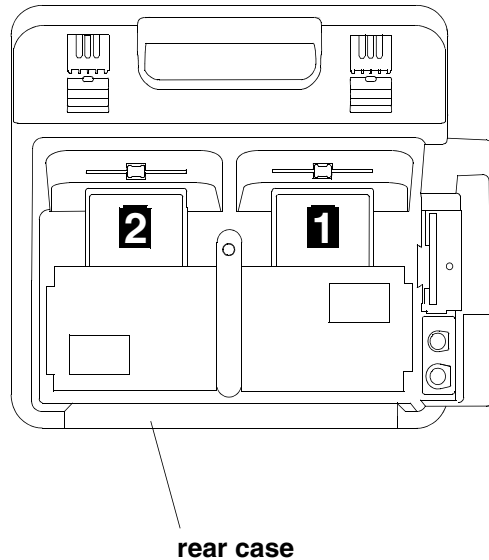
- ◆ To install the parameter bezel, reverse the preceding steps, observing the following:
 - Clean away any adhesive residue on the parameter bezel with isopropyl alcohol.
 - Apply a new parameter bezel label (**158**) to the bezel front. Press the label down firmly.
 - Devices with CO2: To press around the CO2 connector, use a smooth, narrow tool such as a tuning tool (plastic screwdriver) or the large end of a car key.
 - Devices without CO2: Place a label spacer (**386**) into the CO2 recess in the bezel before applying the label.

CAUTION!

Possible moisture leakage. Visually inspect the mating surfaces between the parameter bezel and the rear case before and after screwing it down to ensure they appear even.

To continue, select from the [Summary of Replacement Procedures](#).

Rear Case Replacement—Biphasic Devices



- ◆ To remove the rear case on a biphasic device:
 1. **Disassemble the case.**
 2. Remove the **System/Memory/Therapy PCB assembly.**
 3. Remove the **A06 OEM PCB** (if installed).
 4. Remove either the **Nellcor parameter bezel** or the **Masimo parameter bezel.**
 5. Disassemble the **A21 NIBP/A23 CO2 Module** to remove optional A16 SpO₂, A21 NIBP, A23 CO₂ PCBs (if installed).
 6. Remove the **A03 Power PCB.**
 7. Remove the **A13 Transfer Relay Assembly.**
 8. Remove the **A22 Biphasic PCB.**
 9. Observing orientation, cut the large cable tie (**224**) securing the A15 Energy Storage Capacitor and A17 Interconnect Bracket to the rear case. Remove A15 and A17.
 10. Remove the **A07 Contact PCB.**
 11. Remove the **W08 System Connector Cable** and the **W09 Auxiliary Connector Cable** (use new O-ring seals (**240**) during installation).

(Continued on next page)

Rear Case Replacement—Biphasic Devices *(continued)*

12. Transfer the following parts from the old rear case to the new rear case:

- Two gurney hooks (18)
- Two battery latches (44)
- Modem door kit or PC Card door (26)

Note: For devices using the **current 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 newer EMI shield.

◆ To install the rear case on a biphasic device, reverse the preceding steps, observing the following:

■ Install the following **new** parts:

- Current EMI shield (150)
- Cellulose sponge, with adhesive (266)
- Adhesive capacitor pad (192)
- Two paddle latch covers (28)
- Left latch cover label (174)
- Right latch cover label (176)
- Capacitor mount cover label (156)

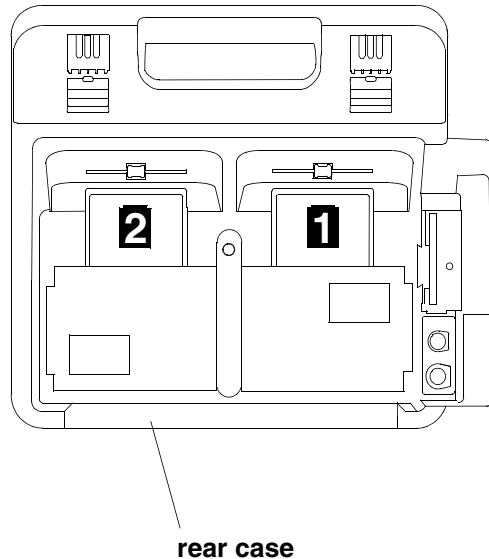
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Rear Case Replacement—Biphasic Devices *(continued)*

- Four mounting feet (202)
- FDA label (166)
- Oximeter patent label (288) – for Nellcor MP-205, Masimo, or Nellcor Nell-3 SpO2 devices only
- Serial number label with overlamine (160)
- Auxiliary/system connector label (168)
- Clean adhesive areas with alcohol.

To continue, select from the [Summary of Replacement Procedures](#).

Rear Case Replacement—Monophasic Devices



- ◆ To remove the rear case on a monophasic device:
 1. **Disassemble the case.**
 2. Remove the **System/Memory/Therapy PCB assembly.**
 3. Remove the **A06 OEM PCB** (if installed).
 4. Remove either the **Nellcor parameter bezel** or the **Masimo parameter bezel.**
 5. Disassemble the **A21 NIBP/A23 CO2 Module** to remove optional A16 SpO₂, A21 NIBP, A23 CO₂ PCBs (if installed).
 6. Remove the **A03 Power PCB.**
 7. Remove the **A13 Transfer Relay Assembly.**
 8. Remove the **A14 Waveshaping Inductor.**
 9. Remove all spade terminals from the A17 Interconnect Bracket terminals. A gripping tool may be necessary.
 10. Observing orientation, cut the large cable tie (**224**) securing the A15 Energy Storage Capacitor and A17 Interconnect Bracket to the rear case. Remove A15 and A17.
 11. Remove the **A07 Contact PCB.**

(Continued on next page)

Rear Case Replacement—Monophasic Devices *(continued)*

12. Remove the **W08 System Connector Cable** and the **W09 Auxiliary Connector Cable** (use new O-ring seals **(240)** during installation).
13. Remove the **W10 cable**.
14. Transfer the following parts from the old rear case to the new rear case:
 - Two gurney hooks **(18)**
 - Two battery latches **(44)**
 - Modem door kit or PC Card door **(26)**

Note: For devices using the **current EMI shield** design, the EMI shield **(150)** is part of the rear case. The foam strips that support the CO2 module are built into the current EMI shield.

(Continued on next page)

Rear Case Replacement—Monophasic Devices *(continued)*

- ◆ To install the rear case on a monophasic device, reverse the preceding steps, observing the following:
 - Install the following **new** parts:
 - Current EMI shield (150)
 - Cellulose sponge, with adhesive (266)
 - Adhesive capacitor pad (192)
 - Two paddle latch covers (28)
 - Left latch cover label (174)
 - Right latch cover label (176)
 - Capacitor mount cover label (156)
 - Four mounting feet (202)
 - FDA label (166)
 - Oximeter patent label (288) – for Nellcor MP-205, Masimo, or Nellcor Nell-3 SpO2 devices only
 - Serial number label with overlamine (160)
 - Auxiliary/system connector label (168)
 - Clean adhesive areas with alcohol.

To continue, select from the [Summary of Replacement Procedures](#).

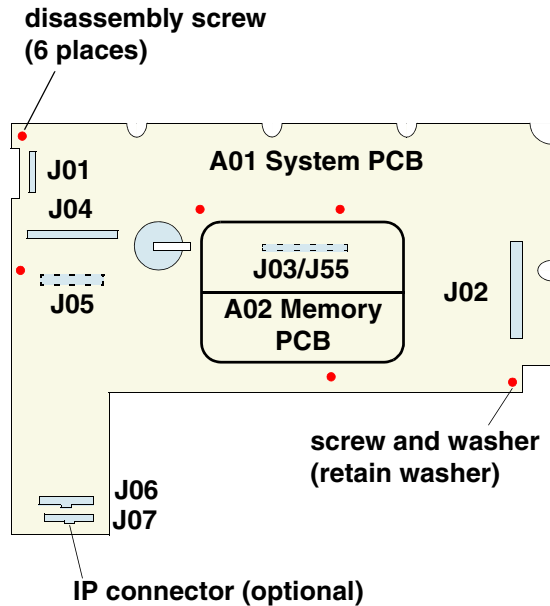
System/Memory/Therapy PCB Assembly Replacement

WARNING!

Shock hazard. Handle all PCBs by their edges until the C15 Pacing Capacitor on the Therapy PCB is discharged in step 7.

◆ To remove the A01 System/A02 Memory/A04 Therapy PCBs as a single unit from the **rear case**:

1. **Disassemble the case.**
2. Remove the six screws (**230**) that secure the A01 System PCB to the rear case (see diagram on the left), and discard. Retain the washer (336) used with the screw located above the ground strap at the lower right corner of the PCB.
3. Disconnect the connectors on the A01 System PCB as follows:
 - J01 – Press the connector retaining clips and disconnect the W01 Power/System PCB cable. The connector is blocked until the A01 System PCB is loosened.
 - J02 – (The W04 System/Interface PCB cable was disconnected during **case disassembly**).
 - J04 – Lift the connector and disconnect the W14 System PCB/PC Card slot cable.



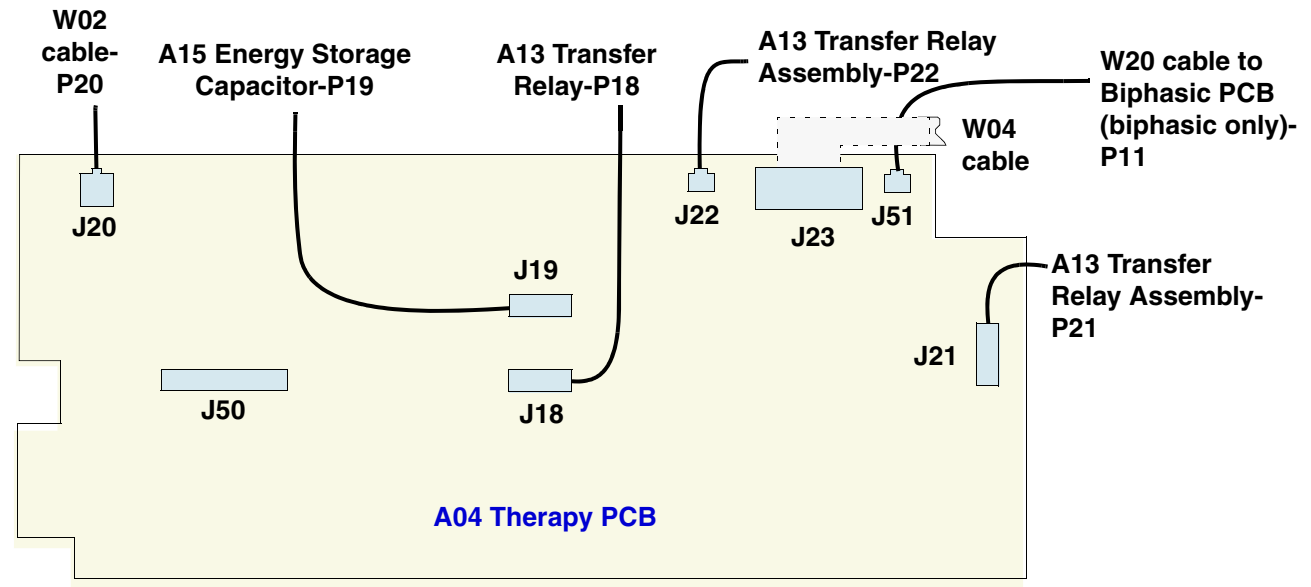
(Continued on next page)

System/Memory/Therapy PCB Assembly Replacement *(continued)* Page 2 of 4

- J06 – Press the connector retaining clip at the bottom of the connector, and then disconnect the W07 ECG Connector Cable.
 - J07 – Press the connector retaining clip (bottom of connector) and then disconnect the W33 IP Connector Cable (if installed).
4. Set the rear case upright and move the System/Memory/Therapy PCB assembly towards the front of the case to gain access to the rear Therapy PCB connectors.
 5. Disconnect the six connectors on the Therapy PCB in the following order (see diagram on the next page):
 - P11 – Disconnect the W20 Biphasic Cable connected to the A22 Biphasic PCB at J51.
 - P21 – Disconnect A13 Transfer Relay Assembly at J21.
 - P22 – Disconnect A13 Transfer Relay Assembly at J22.
 - P18 – Disconnect A13 Transfer Relay Assembly at J18.
 - P19 – Disconnect A15 Energy Storage Capacitor at J19.
 - P20 – Disconnect the W02 Power/Therapy cable at J20.

(Continued on next page)

System/Memory/Therapy PCB Assembly Replacement *(continued)* Page 3 of 4



6. Lift the System/Memory/Therapy PCB assembly from the case and place it on a static-protected, flat surface with the A04 Therapy PCB face up.
7. Immediately **discharge the pacing capacitor**.
8. Note the orientation of the option shield (**144**) (if installed), and remove it from the rear case.

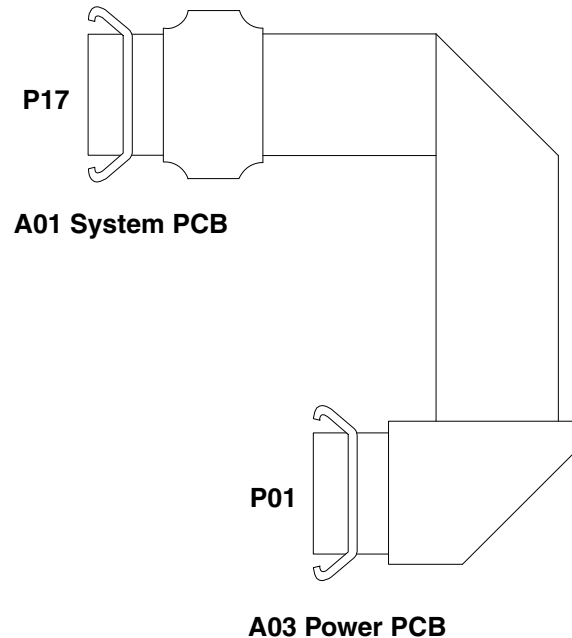
System/Memory/Therapy PCB Assembly Replacement *(continued)* Page 4 of 4

- ◆ To install the System/Memory/Therapy PCBs as a unit, reverse the preceding steps.

Note: Before inserting the six new screws (230) that secure the System/Memory/Therapy PCB unit in the rear case, connect the W01 Power/System PCB Cable to the A01 System PCB at J01. Fold the long tab on the **EMI shield** tab onto the lower right corner of the A01 System PCB, and attach it with one of the PCB mounting screws (230) and the washer (336) retained during the removal process.

To continue, select from the [Summary of Replacement Procedures](#).

W01 Power/System PCB Cable Replacement



◆ To remove the W01 cable from the **rear case**:

1. **Disassemble the case.**
2. Remove the **System/Memory/Therapy PCB assembly.**
3. For orientation, locate A03 Power PCB-J17 on the **rear case diagram**. (The Therapy PCB-J20 end of the W02 cable was disconnected as part of step 2.)
4. Press the connector retaining clips, and then disconnect the W01 cable from the A03 Power PCB at J17.

Note: If the W01 cable is not equipped with a ferrite bundle, discard it. The W01 cable (MIN 3009677-05) is supplied with the A23 Mini-CO2 Module kit.

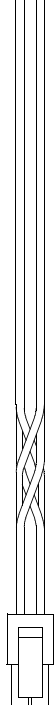
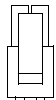
◆ To install the W01 cable, reverse the preceding steps.

To continue, select from the **Summary of Replacement Procedures**.

W02 Power/Therapy PCB Cable Replacement

A04 Therapy PCB

P20



P08

A03 Power PCB

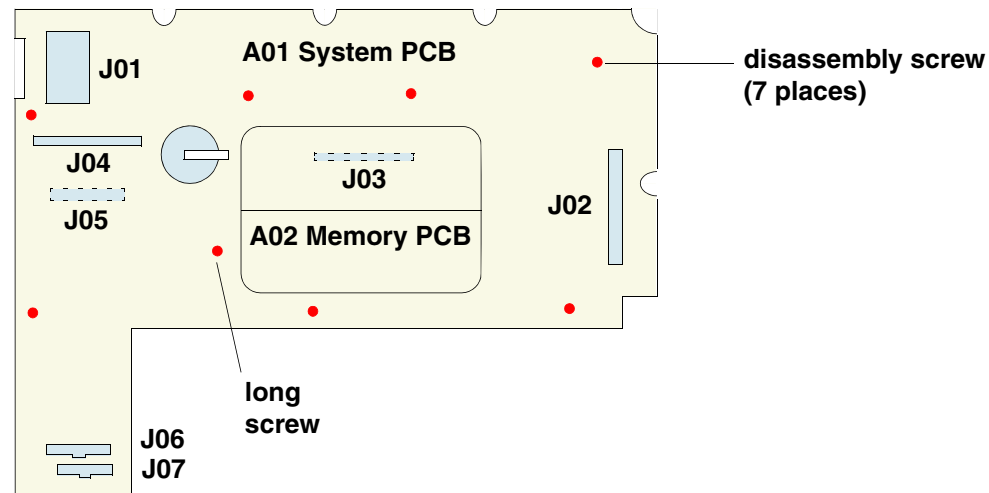
- ◆ To remove the W02 cable from the rear case:
 1. **Disassemble the case.**
 2. Remove the **System/Memory/Therapy PCB assembly.**
 3. Locate the **J08 connector** on the A03 Power PCB. Press the connector retaining clip, and then disconnect the W02 cable at J08.

- ◆ To install the W02 cable, reverse the preceding steps.

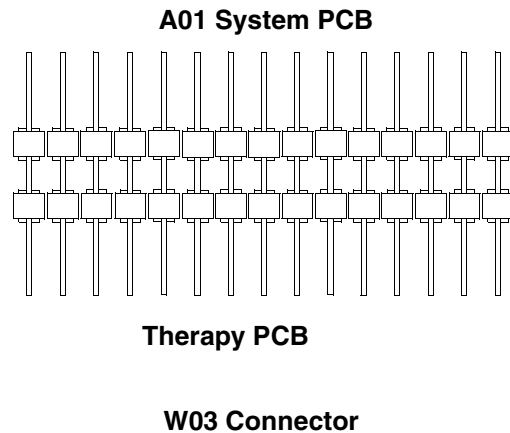
To continue, select from the **Summary of Replacement Procedures.**

W03 System/Therapy PCB Connector Replacement

- ◆ To remove the W03 connector from the rear case:
 1. **Disassemble the case.**
 2. Remove the **System/Memory/Therapy PCB assembly.**
 3. Place the System/Memory/Therapy PCB unit with the A01 System PCB face up. Remove the seven screws (**230**) and the one long screw (**296**). Make sure you loosen the screws and not the screw posts.



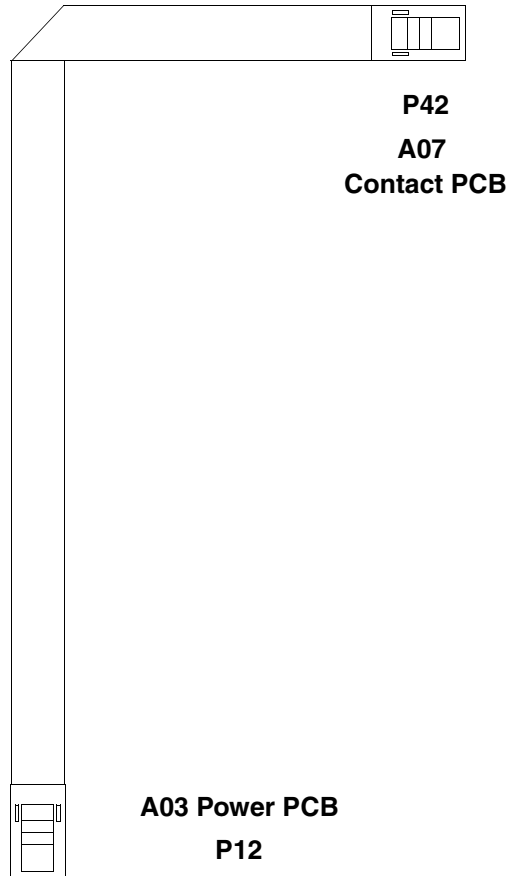
W03 System/Therapy PCB Connector Replacement *(continued)*



4. Gently lift the A01 System/A02 Memory PCBs 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.

To continue, select from the [Summary of Replacement Procedures](#).

W05 Power/Contact PCB Cable Replacement

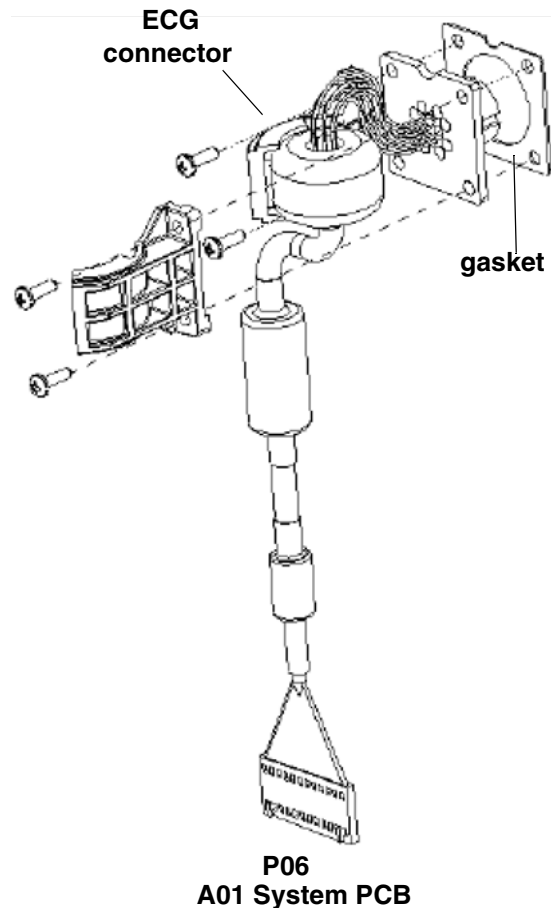


- ◆ To remove the W05 cable from the rear case:
 1. **Disassemble the case.**
 2. Remove the **System/Memory/Therapy PCB assembly.**
 3. Remove the **A07 Contact PCB**, which disconnects the W05 cable from the A07 Contact PCB at J42.
 4. Locate the **J12 connector** on the A03 Power PCB. Press the connector retaining clip, and then disconnect the W05 cable at J12 (may be labeled P12). Remove the cable.

- ◆ To install the W05 cable, reverse the preceding steps.

For the next procedure, see [Summary of Replacement Procedures](#).

W07 ECG Connector Cable Replacement



◆ To remove the W07 ECG Connector Cable from the **rear case**:

1. **Disassemble the case.**
2. Remove the **parameter bezel.**
3. Remove the four screws (**462**) securing the W07 cable. Remove the connector and gasket.

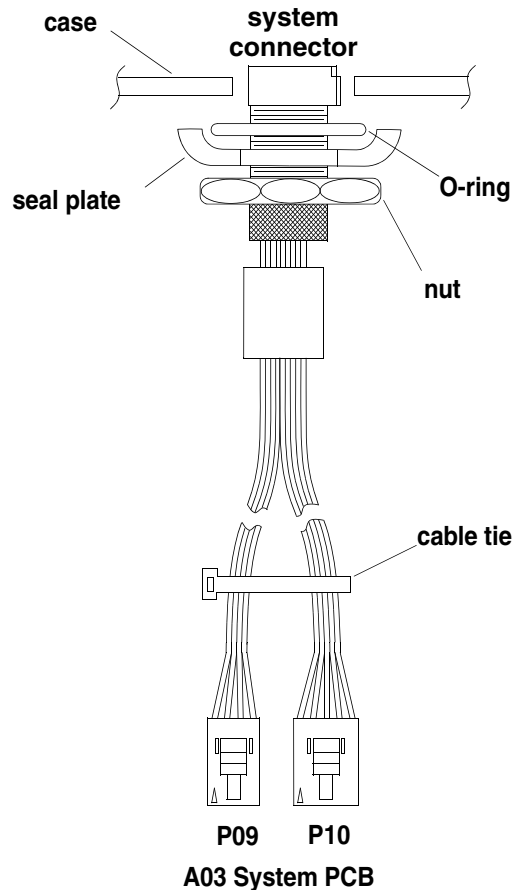
◆ To install the W07 cable, reverse the preceding steps, using a new gasket (**236**).

CAUTION!

Possible moisture leakage. When installing the W07 cable, use a new gasket (**236**) to help prevent ingress of fluids.

To continue, select from the **Summary of Replacement Procedures.**

W08 System Connector Cable Replacement



- ◆ To remove the W08 System Connector Cable from the **rear case**:
 1. Remove the **parameter bezel**.
 2. Remove the **A03 Power PCB**.
 3. Remove the W08 cable nut (**214**), connector seal plate (**220**), and O-ring seal (**240**). Remove the connector.

- ◆ To install the W08 cable, reverse the preceding steps.

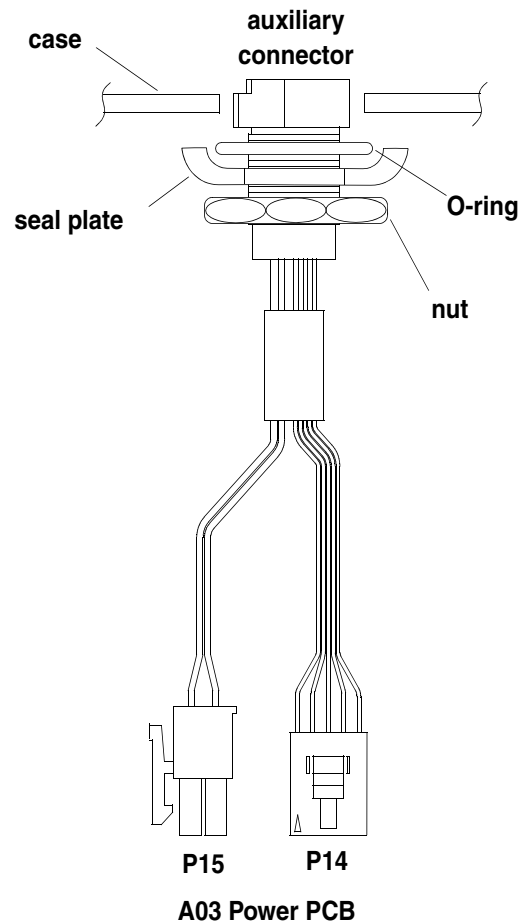
Note: Observe the cable tie replacement when reinstalling the A03 Power PCB. Also note that the O-ring and the seal plate should slide over the connector threads separately.

CAUTION!

Possible moisture leakage. When installing the W08 cable, use a new O-ring seal (**240**) to help prevent ingress of fluids.

To continue, select from the [Summary of Replacement Procedures](#).

W09 Auxiliary Connector Cable Replacement



To remove the W09 Auxiliary Connector Cable from the **rear case**:

1. Remove the **parameter bezel**.
2. Remove the **A03 Power PCB**.
3. Remove the W09 cable nut (**214**), connector seal plate (**220**), and O-ring seal (**240**).
4. Remove the connector.

◆ To install the W09 cable, reverse the preceding steps.

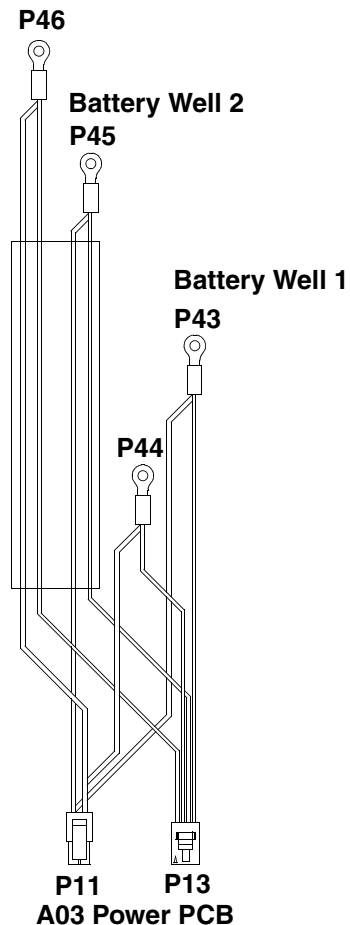
Note: Observe the cable tie replacement when reinstalling the A03 Power PCB. Also note that the O-ring and the seal plate should slide over the connector threads separately.

CAUTION!

Possible moisture leakage. When installing the W09 cable, use a new O-ring seal (**240**) to help prevent ingress of fluids.

To continue, select from the **Summary of Replacement Procedures**.

W10 Battery Pins/Power PCB Cable Replacement— Biphasic Devices



- ◆ To remove the W10 cable from the **rear case** of a biphasic device:
 1. **Disassemble the case.**
 2. Remove the **System/Memory/Therapy PCB assembly.**
 3. Remove the **A06 OEM PCB.**
 4. Remove the **A15 Energy Storage Capacitor.**
 5. Note the orientation of the P22 wiring for reinstallation, and then remove the **A13 Transfer Relay Assembly.**
 6. Disassemble the **A21 NIBP/A23 CO2 Module** 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.
 7. Locate the **A03 Power PCB.** Cut the cable tie that secures the W10 cable wiring to the J11 and J13 connectors on the A03 Power PCB.

(Continued on next page)

W10 Battery Pins/Power PCB Cable Replacement—

Page 2 of 2

Biphasic Devices *(continued)*

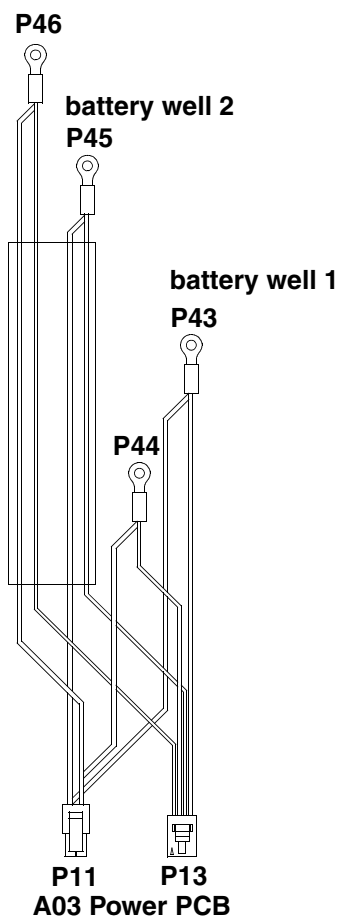
8. Press the connector retaining clip and disconnect the W10 Cable from the A03 Power PCB at J11 and then at J13.
9. Remove the four nuts (216) and lock washers to disconnect terminals P43 and P44 at Battery Well 1, and P45 and P46 at Battery Well 2. Note the wire orientation for reinstalling the wires to the same studs.
10. Remove the cable.

◆ To install the W10 cable, reverse the preceding steps.

Note: Observe the cable tie replacement when reinstalling the A03 Power PCB. Use the cable tie to secure the W10 cable to the cable tie mount (466) located on the A06 OEM PCB.

To continue, select from the [Summary of Replacement Procedures](#).

W10 Battery Pins/Power PCB Cable Replacement— Monophasic Devices



- ◆ To remove the W10 cable from the **rear case** of a monophasic device:
 1. **Disassemble the case.**
 2. Remove the **System/Memory/Therapy PCB assembly.**
 3. Remove the **A06 OEM PCB** (if installed).
 4. Remove the **A13 Transfer Relay Assembly, A14 Waveshaping Inductor, and A15 Energy Storage Capacitor.**
 5. Disassemble the **A21 NIBP/A23 CO2 Module** 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. Locate the A03 Power PCB. Cut the cable tie that secures the W10 cable wiring to the J11 and J13 connectors on the A03 Power PCB.

(Continued on next page)

W10 Battery Pins/Power PCB Cable Replacement—

Page 2 of 2

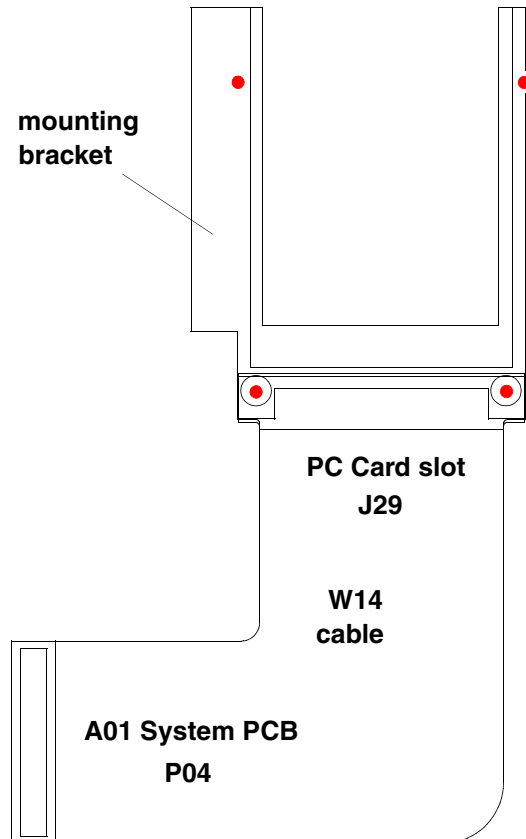
Monophasic Devices *(continued)*

7. Press the connector retaining clip and disconnect the W10 cable from the A03 Power PCB at J11 and then at J13.
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 the wire orientation for reinstalling the wires to the same studs.
9. Remove the cable.

◆ To install the W10 cable, reverse the preceding steps. Observe the cable tie replacement when reinstalling the A03 Power PCB.

To continue, select from the [Summary of Replacement Procedures](#).

W14 System PCB/PC Card Slot Cable Replacement



- ◆ To remove the W14 cable from the **rear case**:
 1. **Disassemble the case.**
 2. Remove the **System/Memory/Therapy PCB assembly.**
 3. Remove the **A06 OEM PCB.**
 4. Remove the **A03 Power PCB.**
 5. 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.

To continue, select from the [Summary of Replacement Procedures](#).

W20 Biphasic Cable Replacement

A22 Biphasic PCB
P106



P11

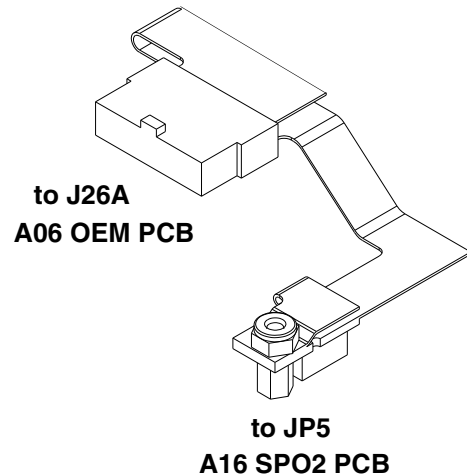
A04 Therapy PCB

- ◆ To remove the W20 cable from the **rear case**:
 1. **Disassemble the case.**
 2. Remove the **System/Memory/Therapy PCB assembly.**
 3. Press the connector retainer clip and eject the W20 cable from the A22 Biphasic PCB at J106.

- ◆ To install the W20 Biphasic Cable, reverse the preceding steps.

To continue, select from the [Summary of Replacement Procedures](#).

W21 OEM PCB/SpO2 Module Cable Replacement, Masimo



- ◆ To remove the W21 cable from the **rear case**:
 1. **Disassemble the case.**
 2. Remove the **System/Memory/Therapy PCBs.**
 3. Remove the **A06 OEM PCB.**
 4. Remove the upper foam (**22**) and pass the **A16 SpO2 Module** back through the hole in the foam. Turn the SpO2 module over and remove the screw (**414**) holding the W21 cable to the JP5 connector.
 5. Disconnect the W21 cable from the A16 SpO2 Module at JP5. The SpO2 module will still be connected to the system by the W22 SpO2 Cable. Set the A16 SpO2 Module aside.

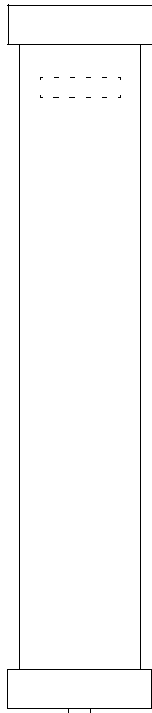
- ◆ To install the W21 cable, reverse the preceding steps.

Note: Apply 4 in lbs of torque when reinstalling the screw retaining W21 to JP5 on the A16 SpO2 Module.

To continue, select from the **Summary of Replacement Procedures.**

W21 OEM PCB/SpO2 Module Cable Replacement, Nellcor

A06 OEM PCB
P26



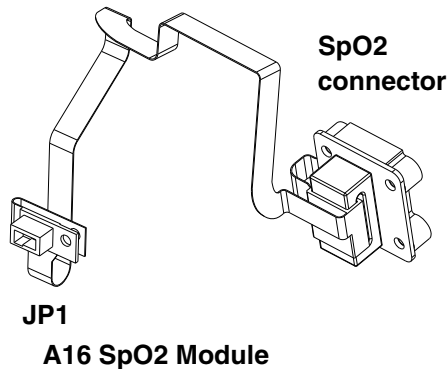
JP5
A16 SpO2 PCB

- ◆ To remove the W21 cable from the **rear case**:
 1. **Disassemble the case.**
 2. Remove the **System/Memory/Therapy PCBs.**
 3. Locate the A06 OEM PCB. Spread the connector retaining clips, and then eject the W21 cable from the A06 OEM PCB at J26A.
 4. Remove the metal retaining clip (**228**), and then disconnect the W21 cable from the A16 SpO2 Module at JP5.

- ◆ To install the W21 cable, reverse the preceding steps.

To continue, select from the **Summary of Replacement Procedures.**

W22 SpO2 Connector Cable Replacement, Masimo



◆ To remove the W22 SpO2 Connector Cable from the **rear case**:

1. **Disassemble the case.**
2. Remove the **parameter bezel.**

Remove the four screws (**234**) securing the W22 SpO2 Connector Cable. Remove the connector from the parameter bezel.

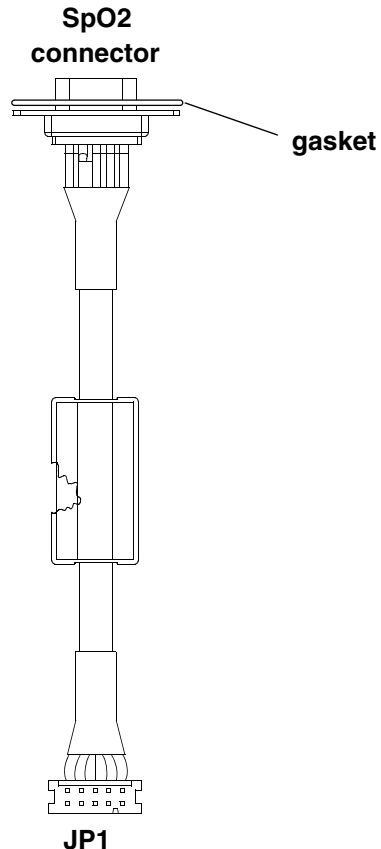
◆ To install the W22 SpO2 Connector Cable, reverse the preceding steps.

CAUTION!

Possible moisture leakage. When installing the SpO2 cable, apply 2 in lbs of torque when reinstalling the screw securing the W22 cable to help prevent ingress of fluids.

To continue, select from the **Summary of Replacement Procedures.**

W22 SpO2 Connector Cable Replacement, Nellcor



A16 SpO2 Module

- ◆ To remove the W22 SpO2 Connector Cable from the **rear case**:
 1. **Disassemble the case.**
 2. Remove the **parameter bezel.**
 3. Remove the two screws (**234**) securing the W22 cable. Remove the connector and gasket (**206**).

- ◆ To install the W22 cable, reverse the preceding steps, using a new gasket (**206**). Place the connector screws through the connector and seal, and then attach to the parameter bezel.

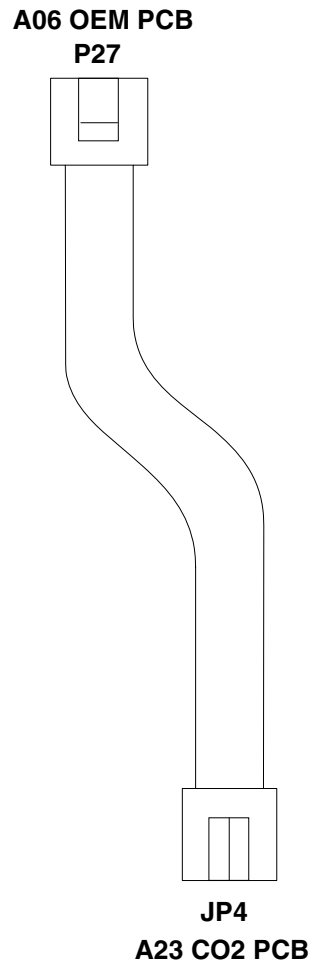
Note: The Nellcor MP-205 SpO2 module requires installation of SpO2 connector cable 3007993-003 or earlier. The NELL-3 SpO2 module requires installation of SpO2 connector cable 3007993-004.

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 screws securing the W22 cable.

To continue, select from the [Summary of Replacement Procedures](#).

W26 OEM PCB/CO2 Module Cable Replacement

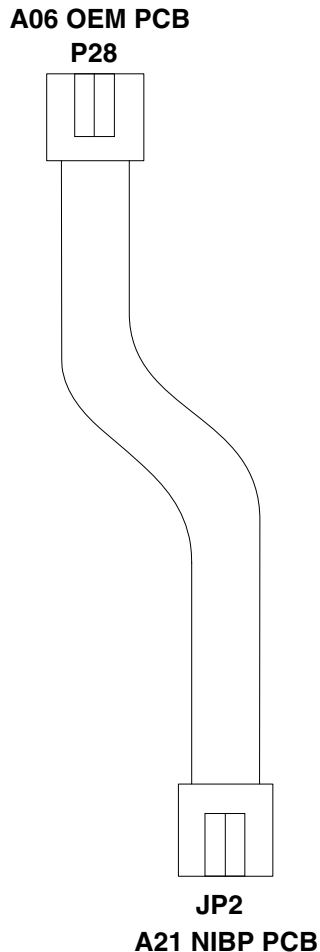


- ◆ To remove the W26 cable from the **rear case**:
 1. **Disassemble the case.**
 2. Remove the **System/Memory/Therapy PCB assembly.**
 3. Remove the **A06 OEM PCB** (the W26 cable will now be disconnected from the A06 OEM PCB).
 4. Remove the **A21 NIBP/A23 CO2 Module.**
 5. Disconnect the W26 cable from the A23 CO2 PCB at J4.

- ◆ To install the W26 cable, reverse the preceding steps.

To continue, select from the **Summary of Replacement Procedures.**

W27 OEM PCB/NIBP Module Cable Replacement

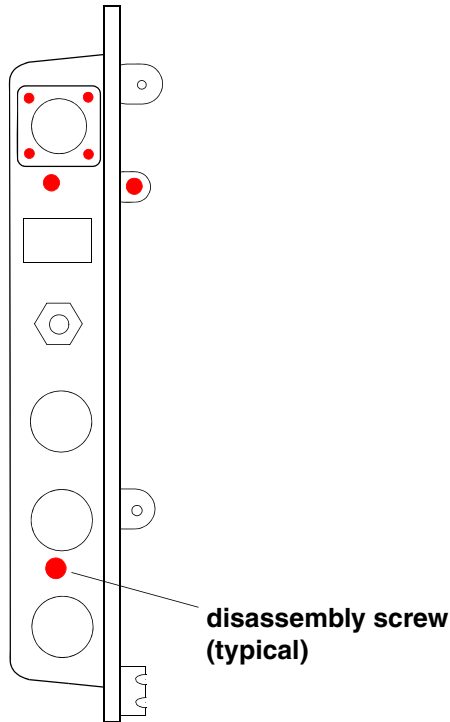


- ◆ To remove the W27 cable from the **rear case**:
 1. **Disassemble the case.**
 2. Remove the **System/Memory/Therapy PCB assembly.**
 3. Remove the **A06 OEM PCB** (the W27 cable will now be disconnected from the A06 OEM PCB).
 4. Remove the **A21 NIBP/A23 CO2 Module.**
 5. Disconnect the W27 cable from the A21 NIBP PCB at J2.

- ◆ To install the W27 cable, reverse the preceding steps.

To continue, select from the **Summary of Replacement Procedures.**

W28 CO2 Inlet Connector Cable Replacement



Note: These steps include the A06 OEM PCB and all options on the parameter bezel. Your device may not have some of these options.

◆ To remove the W28 CO2 Inlet Connector Cable from the parameter bezel (**rear case**):

Note: If the A23 CO2 PCB has already been removed, skip steps 1 through 3. Also, the parameter bezel removal (step 4) will be partially completed.

1. **Disassemble the case.**
2. Remove the **System/Memory/Therapy PCB assembly.**
3. Remove the **A06 OEM PCB.**
4. Remove the **parameter bezel.**
5. Spread the arms of the CO2 connector retainer (**358**) and slide the W28 cable out of the retainer.
6. 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**).

W28 CO2 Inlet Connector Cable Replacement *(continued)*

- ◆ To install the W28 CO2 Inlet Connector Cable, reverse the preceding steps, observing the following:
 - 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).

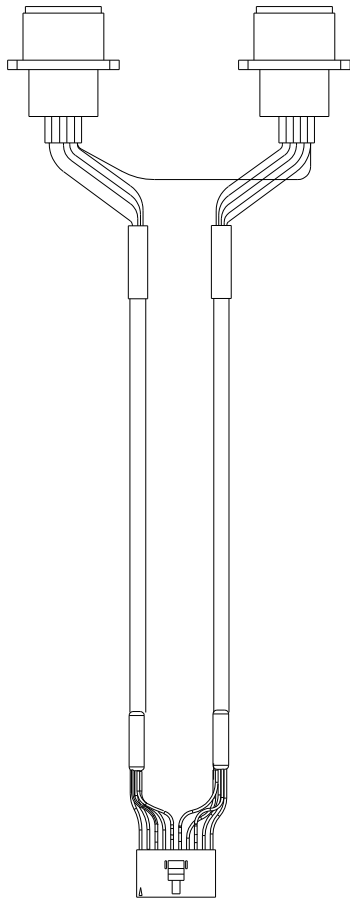
Note: The CO2 connector adapter should have a magnet glued in place on its underside.
 - Apply the parameter bezel label (158) to the new bezel front.
 - Install the CO2 connector cover (356) onto the adapter.

CAUTION!

Possible moisture leakage. When installing the W28 cable, apply 2 in lbs of torque when reinstalling the screw retaining the W28 cable to help prevent ingress of fluids.

To continue, select from the [Summary of Replacement Procedures](#).

W33 Invasive Pressure Connector Assembly Replacement



- ◆ To remove the invasive pressure connector assembly from the **rear case**:
 1. **Disassemble the case.**
 2. Remove the **System/Memory/Therapy PCB assembly.**
 3. Remove the **A06 OEM PCB.**
 4. Remove the **parameter bezel.**
 5. Remove the eight screws (**230**) and washers (**336**) securing the IP connectors to the parameter bezel. Remove the IP connectors and gaskets (**406**).
 6. Disconnect the IP connector cable from the A01 System PCB J7 connector.

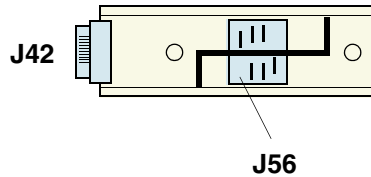
◆ To install the W33 Invasive Pressure Connector Assembly, reverse the preceding steps.

CAUTION!

Possible moisture leakage. When installing the cable, use new gaskets (**406**) to help prevent ingress of fluids.

For the next procedure, see [Summary of Replacement Procedures](#).

A07 Contact PCB Replacement

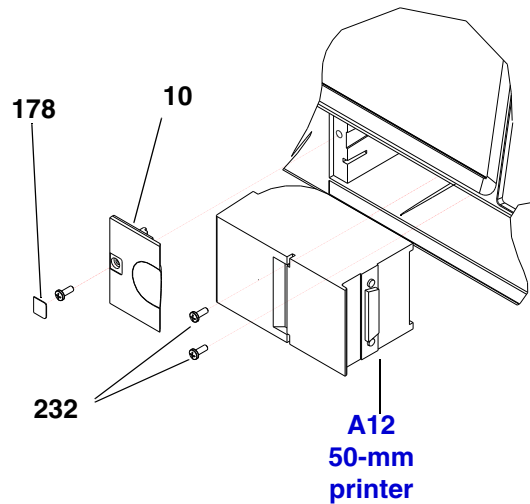


- ◆ To remove the **A07 Contact PCB** (from outside the rear case):
 1. Lay the device face down on a static-free, non-abrasive surface.
 2. Remove the two screws (**232**) from the battery retainer (**24**) between the battery wells. Lift away the battery retainer. For devices with CO2, unplug the exhaust tubing (**392**). Do not let the exhaust tubing fall inside the case.
 3. Pull the A07 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 the **LIFEPAK NiCd** or **LIFEPAK SLA** battery.)

- ◆ To install the A07 Contact PCB, reverse the preceding steps.

To continue, select from the [Summary of Replacement Procedures](#).

A12 Printer Assembly (50 mm) Replacement



Note: See [A12 Printer Assembly \(100 mm\) Replacement](#) to replace the 100-mm printer.

◆ 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 printer filler panel (**10**), and then 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 devices 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)*

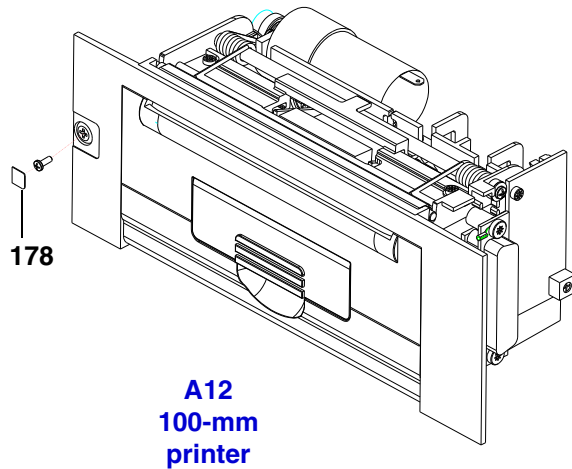
◆ To install the A12 Printer Assembly, reverse the preceding steps. After reassembly, complete the TCP – Printer Calibration procedure.

Note: The A12 Printer (50 mm) can be **repaired** (in a limited fashion).

Note: The device software is configured for a specific type of printer. The 50-mm and 100-mm printers are not interchangeable.

To continue, select from the **[Summary of Replacement Procedures](#)**.

A12 Printer Assembly (100 mm) Replacement



Note: See [A12 Printer Assembly \(50 mm\) Replacement](#) to replace the 50-mm printer.

- ◆ 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. Carefully peel away the label (**178**) from the screw and loosen the screw.
 4. From the front side, loosen the two screws (**232**) from inside the A12 Printer Assembly.
 5. Grasp the door near the speaker side, and then gently pull up and push toward the speaker (to disengage the connector on the opposite side). Lift the printer out and set it aside.
 6. For printers MIN 3006229-003 or earlier, check 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. The printhead resistance value is used when completing the TCP – Printer Calibration.

Note: For printers MIN 3006229-005 or later, enter the printhead resistance as R=1200 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 preceding steps.

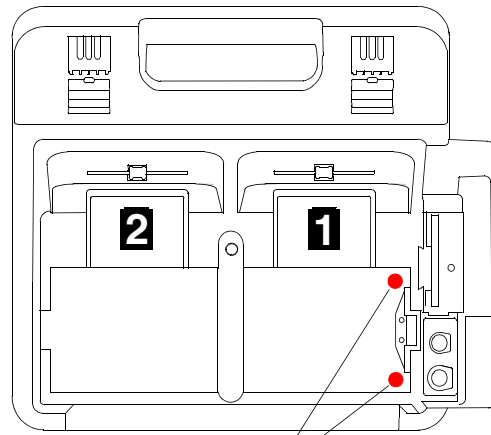
Note: The new printer comes in a repair kit with new screws installed to aid reassembly. Also included with the new printers are a third screw and a screw cover label.

Note: The 100-mm A12 Printer Assembly, MIN 3006229-003 or earlier, can be **repaired** (in a limited fashion).

Note: The device software is configured for a specific type of printer. The 50-mm and 100-mm printers are not interchangeable.

To continue, select from the [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:

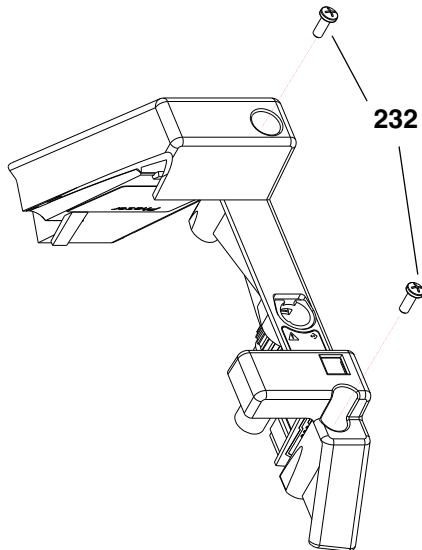
1. Using a 5/32-inch nut driver, unscrew the pin and remove it.
2. Hand-thread the new battery pin (**186**) into position and then tighten firmly, but do not overtighten.

The battery pins are replaced every two years (see [Scheduled Replacement Items](#)).

Note: The battery grommets (**208**) are not replaceable. Complete the [Rear Case Replacement](#) procedure to repair damaged battery grommets.

To continue, select from the [Summary of Replacement Procedures](#).

LIFEPAK 12 Voice Recorder Replacement

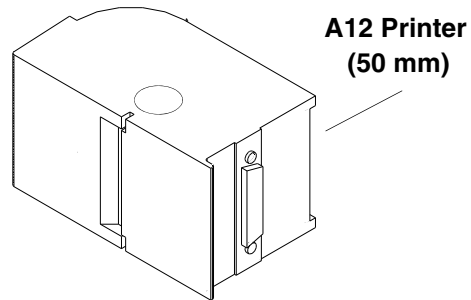


- ◆ To remove the LIFEPAK 12 voice recorder assembly (MIN 3201649):
 1. Remove the two screws (**232**) that secure the voice recorder assembly to the device.
 2. Pull the voice recorder assembly straight back, disconnecting the LIFEPAK 12 voice recorder connector from the LIFEPAK 12 defibrillator/monitor system connector.

- ◆ To install the LIFEPAK 12 voice recorder assembly:
 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 device, and verify that no wires are pinched between the voice recorder and the device.
 3. Mount the voice recorder with two screws (**232**).

To continue, select from the [Summary of Replacement Procedures](#).

Repairing the A12 Printer (50 mm)



Removing the Motor Assembly

This section provides instructions for repairing the A12 Printer (50 mm). See the [A12 Printer \(50 mm\) Assembly Diagram](#) 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, see [A12 Printer Assembly \(50 mm\) Replacement](#).

- ◆ To remove the motor assembly:
 1. Using a knife blade or small slotted screwdriver, 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.

Repairing the A12 Printer (50 mm) *(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 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)

Repairing the A12 Printer (50 mm) *(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 the bushing is fully seated.

(Continued on next page)

Repairing the A12 Printer (50 mm) *(continued)*

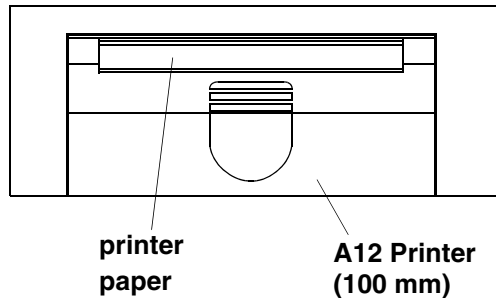
Removing the Printroller Assembly

- ◆ To remove the printroller assembly:
 1. Deflect out the door flange adjacent to the printroller gear, and then 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 assembly:
 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 D-shaped door 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 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.

Repairing the A12 Printer (100 mm)



Removing the Paper Cradle

This section provides instructions for repairing the A12 Printer (100 mm), **MIN 3006229-003 and earlier**. See 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 device, see [A12 Printer Assembly \(100 mm\) Replacement](#).

Removal and installation of the paper cradle can be accomplished without removing the printer assembly from the LIFEPAK 12 defibrillator/monitor.

◆ To remove the paper cradle (if necessary):

1. Open the printer 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 can 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.

Repairing the A12 Printer (100 mm) *(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 device.
 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)

Repairing the A12 Printer (100 mm) *(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 printer 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 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 then position the connector beneath the retainer clip, between the molded ribs.

(Continued on next page)

Repairing the A12 Printer (100 mm) *(continued)*

Page 4 of 5

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 device.
 2. Open the printer door (after the printer assembly has been removed).
 3. **Remove the paper cradle.**
 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.

6. Disengage the pivot pin at the other side of the printer door, and pull out on the door to remove.

(Continued on next page)

Repairing the A12 Printer (100 mm) *(continued)*

Installing the Door/ Roller Assembly

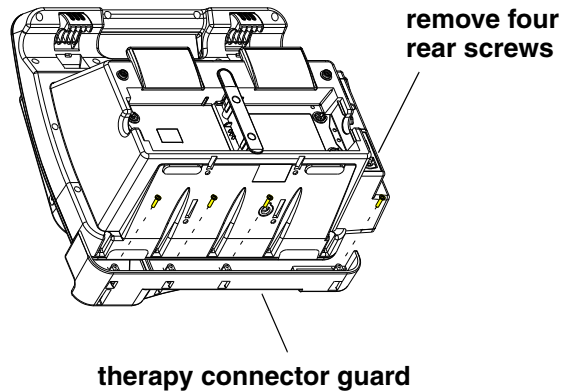
- ◆ To install the door/roller assembly:
 1. Engage the pivot pin on the left side of the printer door.
 2. **GENTLY** press inward on the flange at the right side of the printer, and slip the right pivot pin on the printer door into place.

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. **Install the paper cradle.**

Therapy Connector Guard Replacement



The therapy connector guard provides additional protection to the therapy cable where it connects to the device.

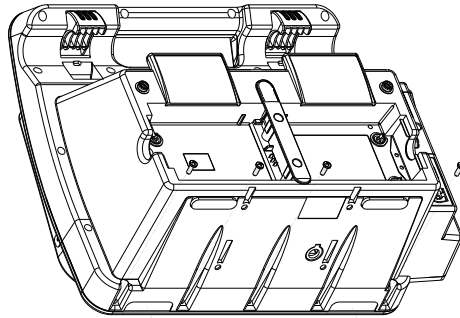
◆ To remove the therapy connector guard from the bottom front of the device:

1. Remove the four, long, 6-32 screws along the bottom of the rear case.
2. Pull the therapy connector guard down and away from the device case.
3. Set the therapy connector guard and the four screws aside.

◆ To install the Therapy Connector Guard Kit (MIN 3206037) onto the bottom front of the device:

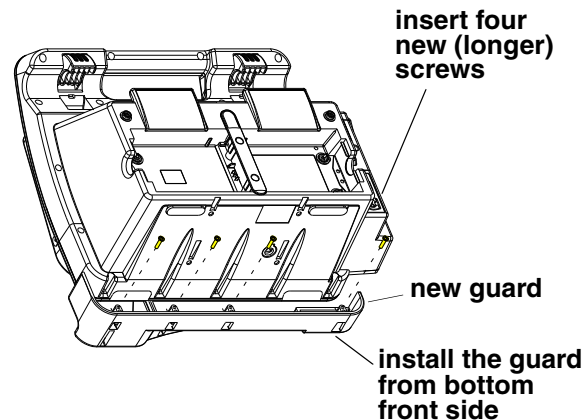
Item	Quantity	MIN	Part Description	Note
	1	3204034-001	Therapy connector Guard	
460	4	202253-576	Screw, 6-32 × .75 L	Repair kit, MIN 3011608-05
	1	3205136-900	Warning label sheet (Explosion Hazard)	

Therapy Connector Guard Replacement *(continued)*



remove two front feet

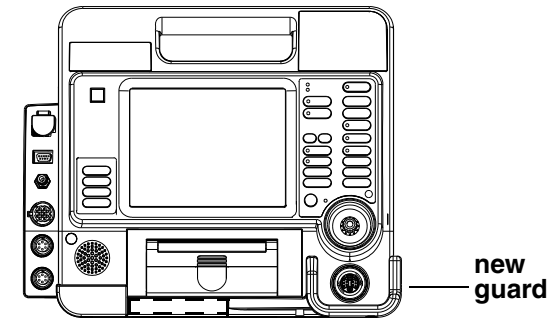
1. Remove the two front feet (if installed) as shown.
2. Use the four new, long #6-32 screws (460) to connect the guard to the rear of the device.
3. Install the appropriate warning label (Explosion Hazard) to the front of the guard where shown.
4. Replace the device into the soft case.
5. Reconnect the therapy cable to the therapy connector.



insert four new (longer) screws

new guard

install the guard from bottom front side



new guard

locate new label on the guard

Therapy Cable Shield Installation

Installing the LIFEPAK 12 Therapy Cable Shield Kit, MIN 3203003

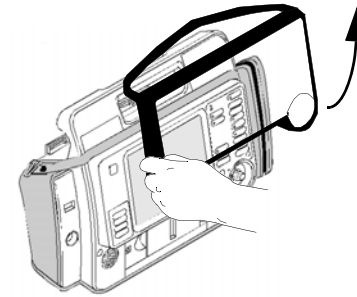
Install the LIFEPAK 12 cable shield kit to provide additional protection to the therapy cable where it connects to the LIFEPAK 12 defibrillator/monitor.

1. If the LIFEPAK 12 defibrillator/monitor currently has any accessory occupying the area around the therapy connector, remove it and set it aside.

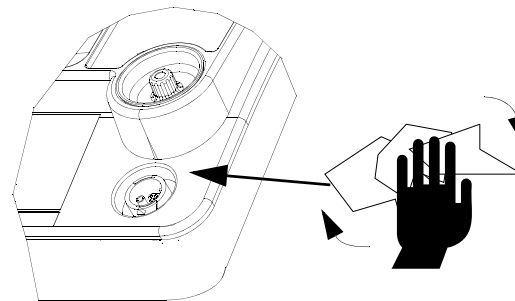
1a.



1b.



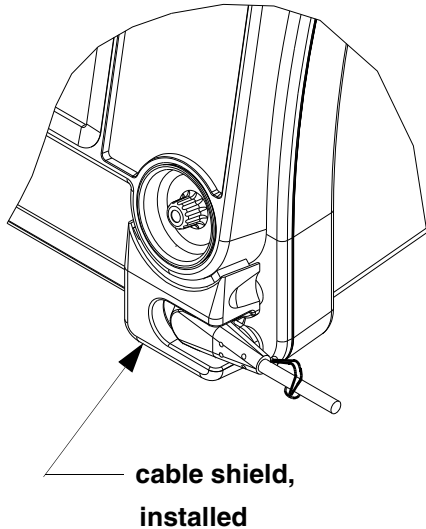
2. Clean the therapy connector area well, using a soft cloth or an alcohol wipe.



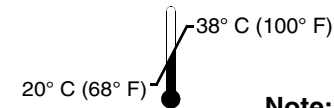
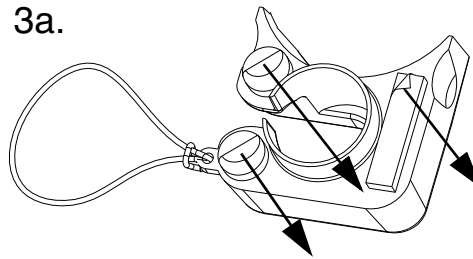
(Continued on next page)

Therapy Cable Shield Installation *(continued)*

Installing the LIFEPAK 12 Therapy Cable Shield Kit, MIN 3203003 *(continued)*

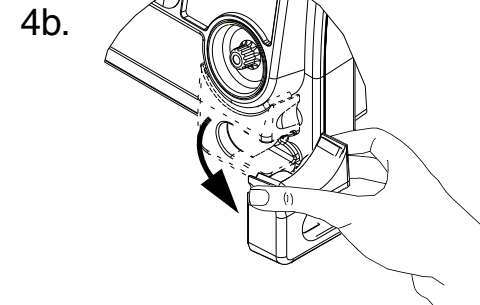
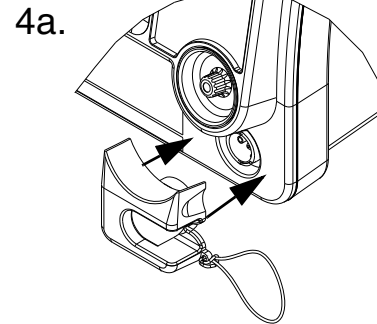


3. Remove the cable shield from its packaging and orient it with the adhesive-backed, hook-and-loop fastener material toward you. Peel the backing from the adhesive (three places).



Note: Adhesive mounting is intended for application at temperatures shown.

4. Apply the cable shield, with mounting tape facing the device, as shown:



5. Rotate the cable shield off the device, as shown, to release the fastener hooks from the loops. Ensure that the three released fastener pieces stay on the device.

Software and Device Upgrades

The LIFEPAK 12 defibrillator/monitor software, hardware configuration settings and device upgrade procedures require specialized training and entail information proprietary to Physio-Control. These procedures should only be performed by authorized Physio-Control personnel.

Contact your local Physio-Control representative for assistance.

Verifying the Configuration Data

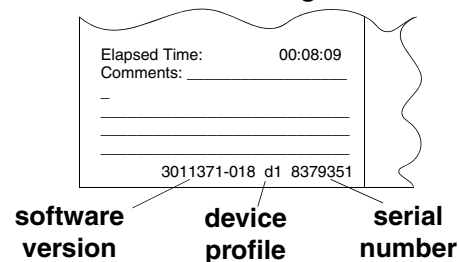
CAUTION!

Possible inoperable device. The configuration data is critical for proper operation of the device. If the device configuration data is lost, the device **CANNOT BE USED**. Contact factory support if you lose this data.

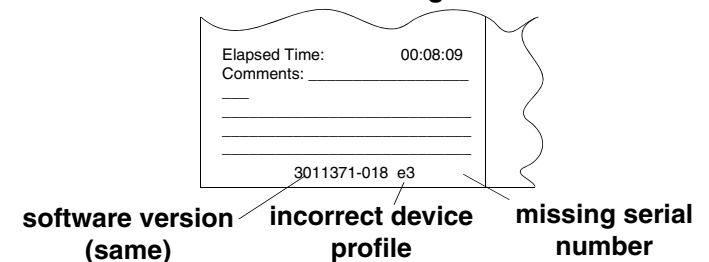
The device configuration data consists of the manufacturing code, device profile (options, features), serial number, calibration data, and user setup configuration. This data is stored on a 32-kilobyte memory device that is powered by a coin battery located on the A01 System PCB. If this coin battery is improperly replaced or is dead, the device configuration data will be lost.

To check if your device has lost the configuration data information, turn on the device and press CODE SUMMARY. A device that has lost configuration data will not display a serial number on the CODE SUMMARY report and may also show an incorrect device profile.

device with correct configuration data



device with incorrect configuration data



(Continued on next page)

Verifying the Configuration Data *(continued)*

The LIFEPAK 12 defibrillator/monitor device configuration data can be loaded only by authorized Physio-Control personnel. Contact your local Physio-Control representative for assistance.

Parts Lists and Assembly Diagrams

This section is a hierarchical reference used to identify components needed to repair the LIFEPAK 12 defibrillator/monitor.

[Section Glossary](#)

[Assembly Diagram Configurator](#) — provides links to all assembly diagrams

[Front Labeling and Therapy Cable Protectors Diagram](#)

[Front Case Assembly Diagrams](#)

Common Case Parts Only	EL Display Device
LCD Device	

[Front Case Parts Lists](#)

Common Front Case Parts	LCD Device Parts Only
EL Display Device Parts Only	

Parts Lists and Assembly Diagrams

(continued)

Rear Case Assembly Diagrams

Common Case Parts Only	Bezel with CO2 and NIBP
Biphasic Device	Bezel with IP
Monophasic Device	Nellcor Nell-3 SpO2 Module
Bezel with ECG and Masimo SpO2	Masimo SpO2 Module
Bezel with Nellcor SpO2	

Rear Case Parts Lists

Common Rear Case Parts	Monophasic Parts
Biphasic Parts	

Biphasic Device Configuration Parts Lists

Basic Device with ECG Only	Masimo SpO2, NIBP, CO2, IP
Nellcor SpO2, NIBP, CO2, IP	

System/Memory/Therapy PCB Assembly Diagram

System/Memory/Therapy PCB Assembly Parts List

(Continued on next page)

Parts Lists and Assembly Diagrams

(continued)

A12 Printers

A12 Printer (50 mm) Assembly Diagram	A12 Printer (50 mm) Parts List
A12 Printer (100 mm) Parts List	

A09 Small Keypad Language

A10 Large Keypad Language

Parameter Bezel Label Language

Product Identification Label Language—Monophasic Devices

Product Identification Label Language—Biphasic Devices

Explosion/Hazard Label Language

Operating Instruction Label Language

Operating Instruction Label Language

Font and Voice Software Language

(Continued on next page)

Parts Lists and Assembly Diagrams

(continued)

[Standard Paddle Assembly Diagrams](#)

[Standard Paddle Parts List — Apex and Sternum](#)

[Biphasic Interconnect Diagram](#) — shows detailed assembly and cable interconnect information and provides links to each part diagram

[Repair Kits](#) — contain all items needed to replace major components with separate MINs for each kit

[Defibrillator Part Number and Serial Number](#) — useful for decoding the SN on the device label, which displays the manufacturing code

[Ordering Parts](#) — to obtain replacement parts for the device

Note: Devices with the SpO2 option manufactured prior to July 1999 will have different parts than the ones shown.

Note: To view lists of MINs (part numbers) for language options (for example, labels and keypads), click the **Select other language** link (if available) in the Note column of a parts list.

Note: For additional parts lists, including items necessary to keep the device in clinical service, see [Devices, Options, 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, and System/Memory/Therapy PCB Assembly.
- **Internal parts** are components internal to the case that are specific to your device.
- **External parts** are components external to the case that are specific to your device.
- The **Item** column in a parts list provides a reference number for each unique part on the device. Most major parts include detailed diagrams. View them by clicking the item number.
- The **Quantity** column identifies how many of the listed part is used in the assembly.
- **MIN** refers to the Physio-Control manufacturer's item number.
- **CAT.** number is used for ordering each part.
- The **Part Description** column provides a brief description of each part in the parts list.
- **PN** is the part number that identifies the model of each LIFEPAK 12 defibrillator/monitor.

Section Glossary *(continued)*

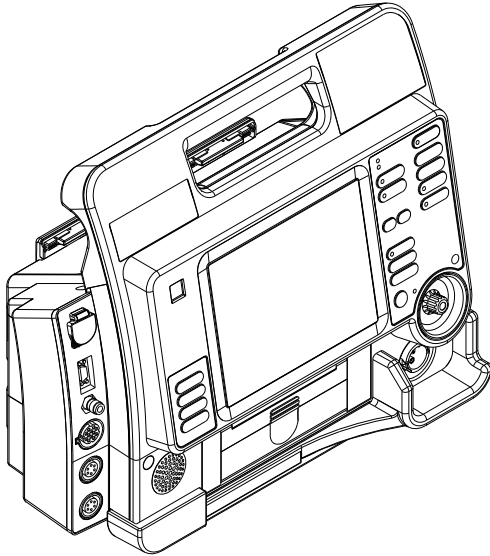
- **Options** are assemblies that are not required on the basic device and can be specified by the customer when purchased. Parts on these assemblies may be referred to as optional parts.

Assembly Diagram Configurator

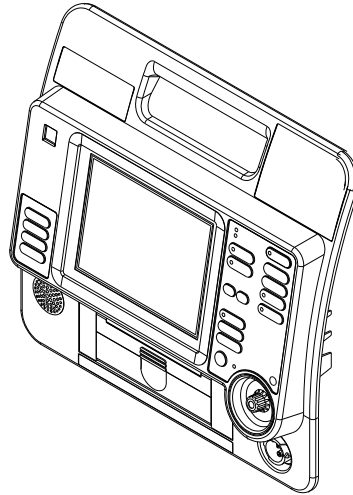
Introduction

Click a link below to view detailed assembly diagrams.

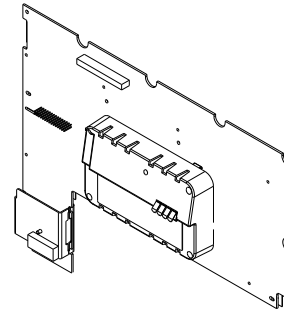
Front labeling & therapy cable protectors diagram



Front case assembly diagrams



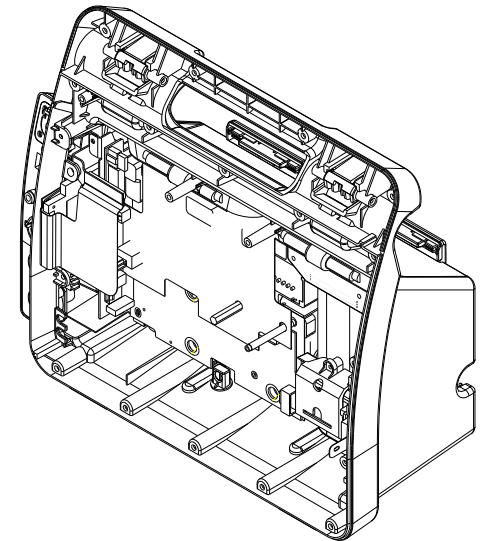
System/Memory/Therapy PCB assembly diagram



Rear Case assembly diagrams

monophasic only

biphasic only



Assembly Diagram Configurator *(continued)*

Optional Device Assemblies

Use the following links to quickly locate the following optional parts on the appropriate assembly diagram.

[A06 OEM PCB](#)

[A11 EL Display Assembly](#)

[A11 LCD Assembly](#)

[A16 Nellcor Nell-3 SpO2 Module](#)

[A16 Masimo SpO2 Module](#)

[A21 NIBP Module](#)

[A23 CO2 Module](#)

[A23 Mini-CO2 Module](#)

[W07 ECG Connector Assembly](#)

[W22 Nellcor SpO2 Connector Assembly](#)

[W22 Masimo SpO2 Connector Assembly](#)

[W28 CO2 Inlet Connector Cable](#)

[W33 IP Connector Assembly](#)

[50-mm Printer](#)

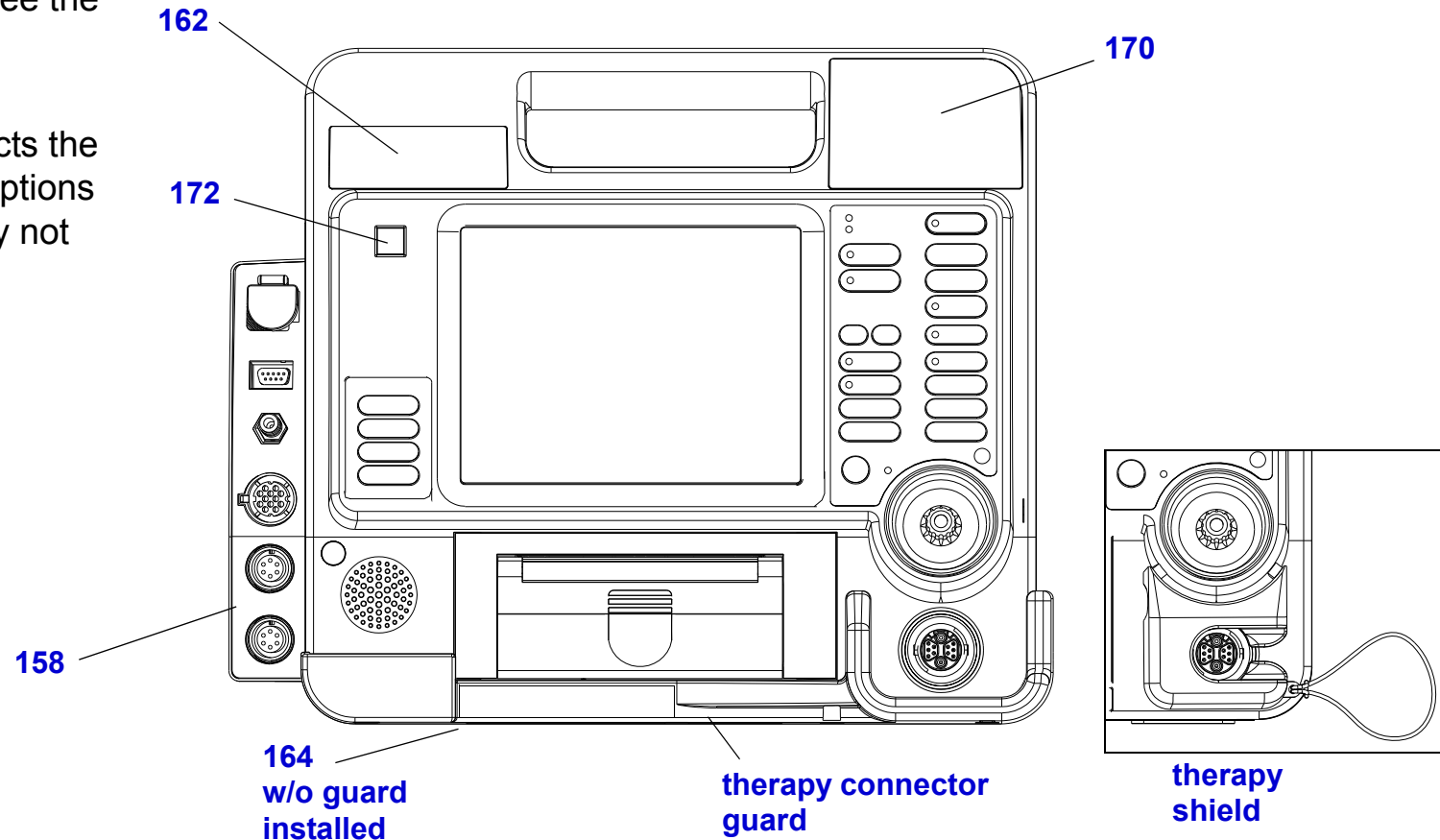
[100-mm Printer \(components not shown\)](#)

[Standard Paddles Assembly](#)

Front Labeling and Therapy Cable Protectors Diagram

Click an item number to see the corresponding MIN (part number).

Note: This diagram reflects the device with all available options installed. Your device may not have all of these options.



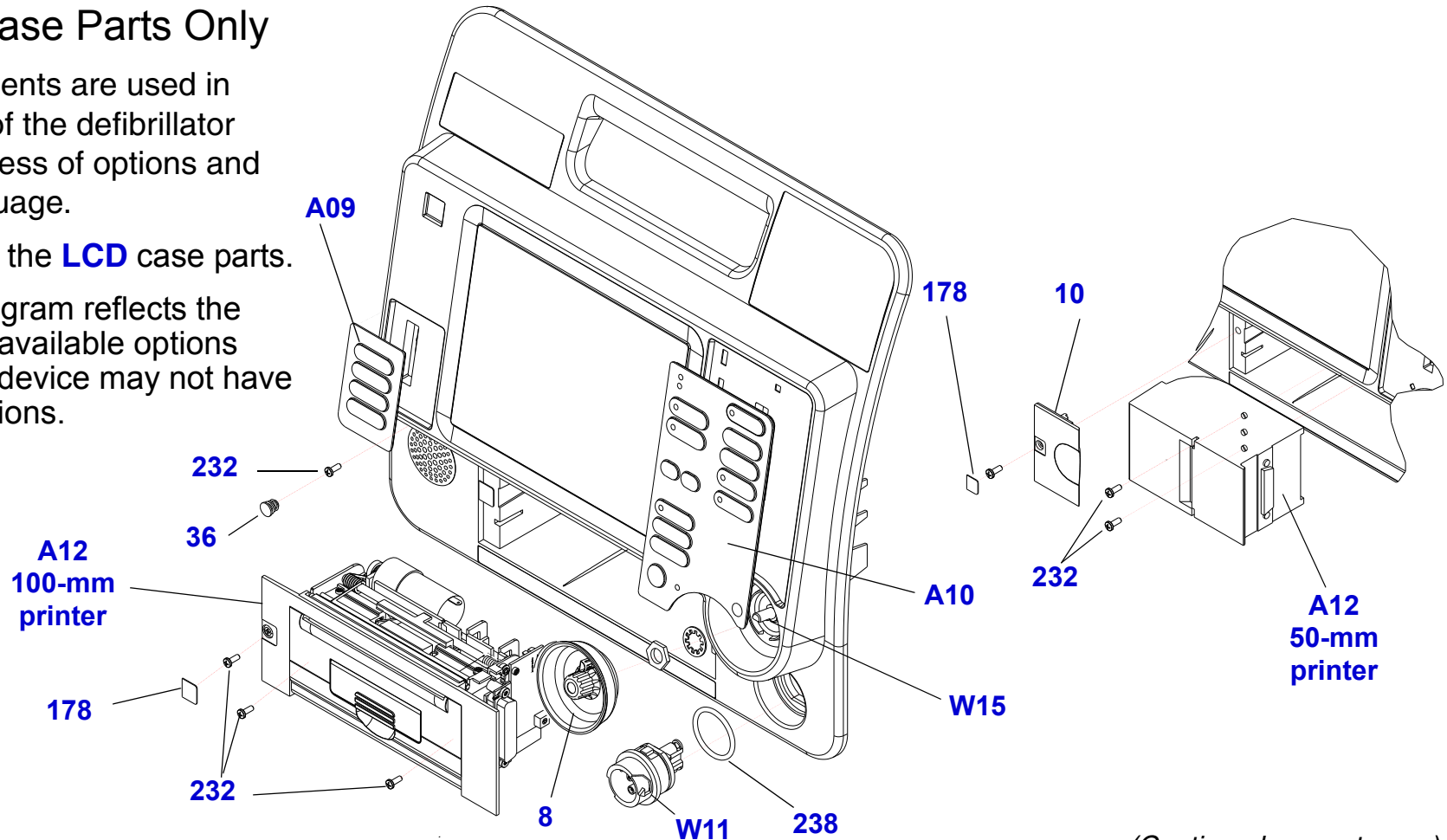
Front Case Assembly Diagrams

Common Case Parts Only

These components are used in every version of the defibrillator device, regardless of options and operating language.

View the [EL](#) or the [LCD](#) case parts.

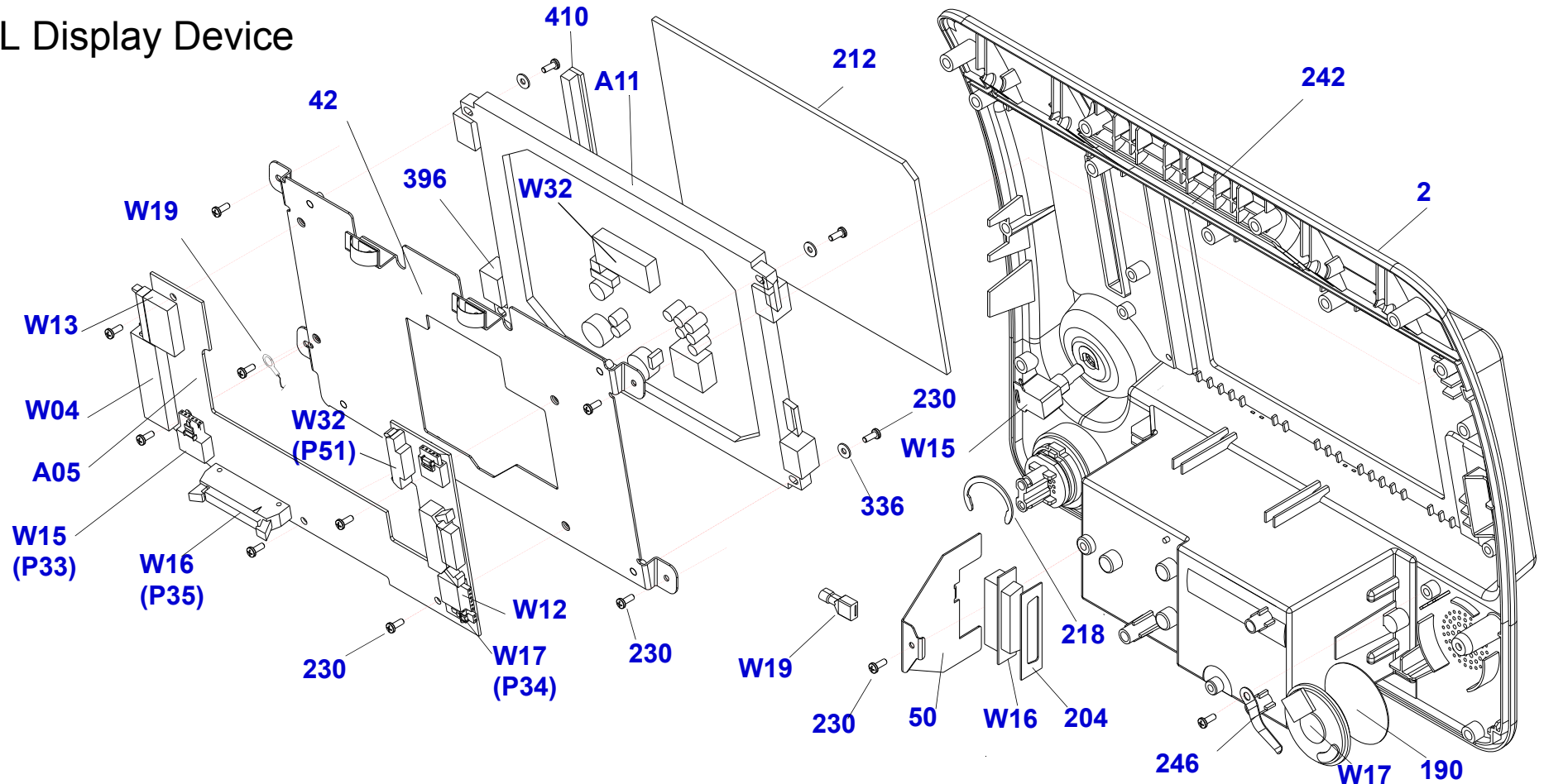
Note: This diagram reflects the device with all available options installed. Your device may not have all of these options.



(Continued on next page)

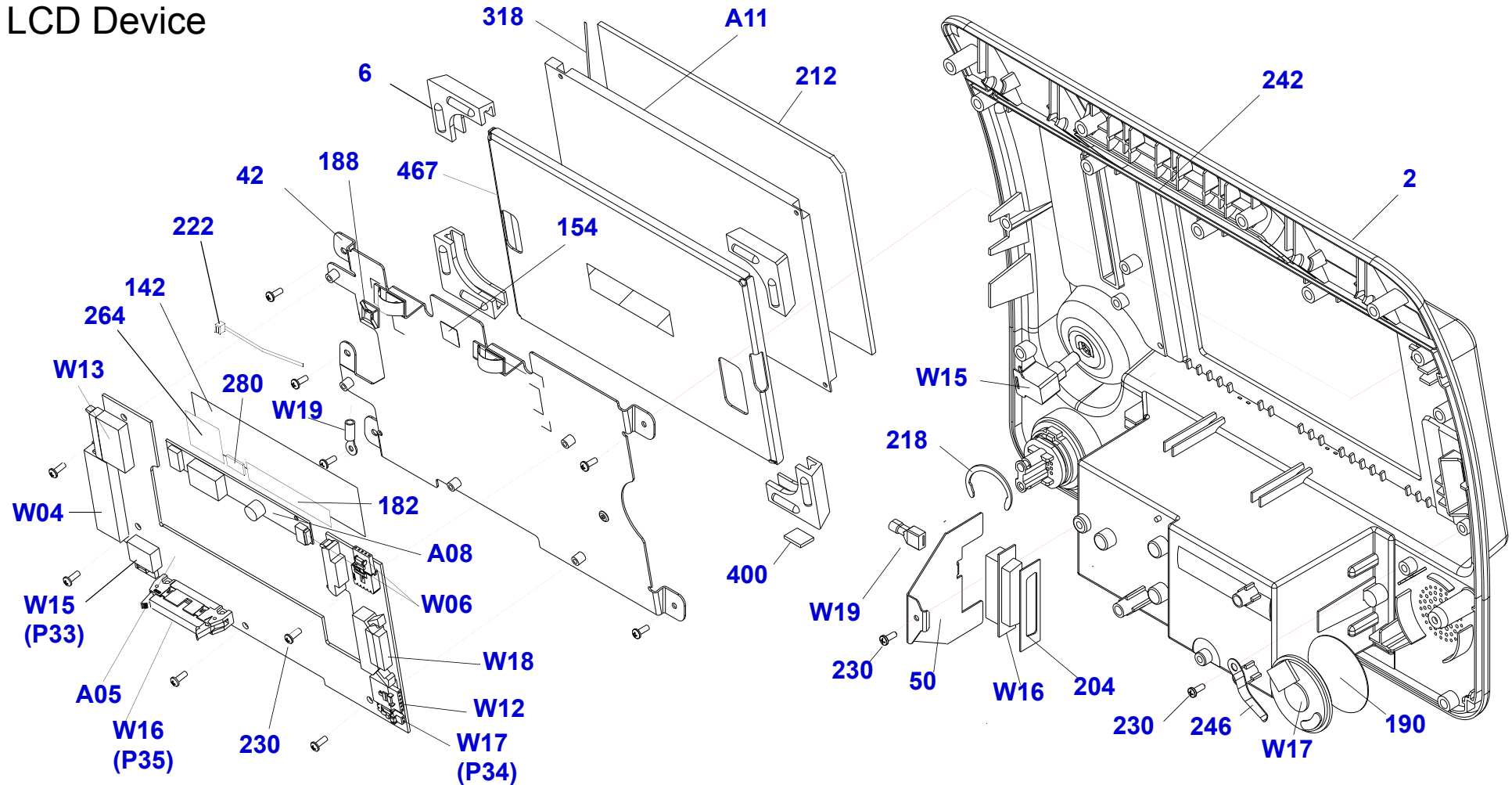
Front Case Assembly Diagrams *(continued)*

EL Display Device

*(Continued on next page)*

Front Case Assembly Diagrams *(continued)*

LCD Device

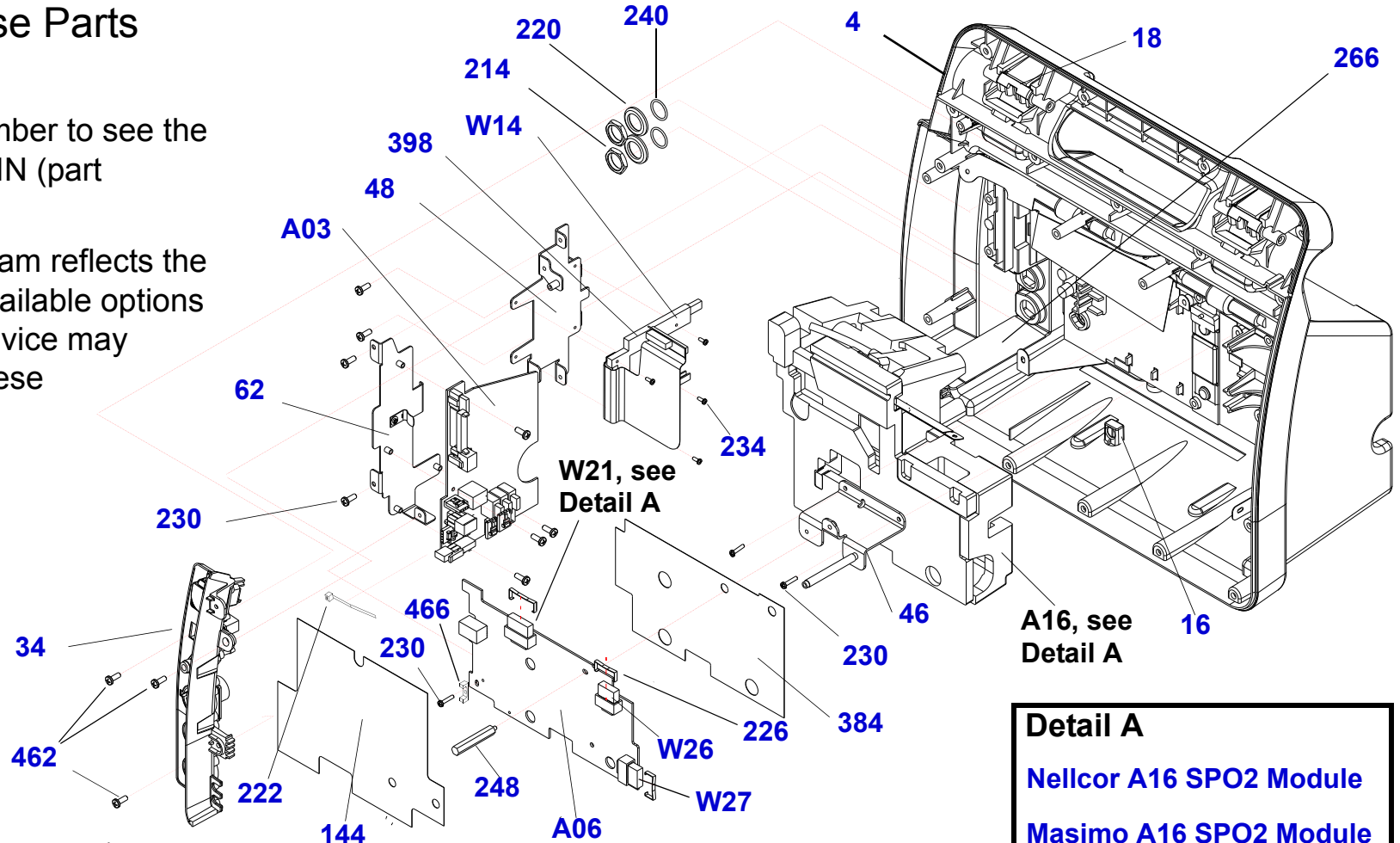


Rear Case Assembly Diagrams

Common Case Parts Only

Click an item number to see the corresponding MIN (part number).

Note: This diagram reflects the device with all available options installed. Your device may not have all of these options.

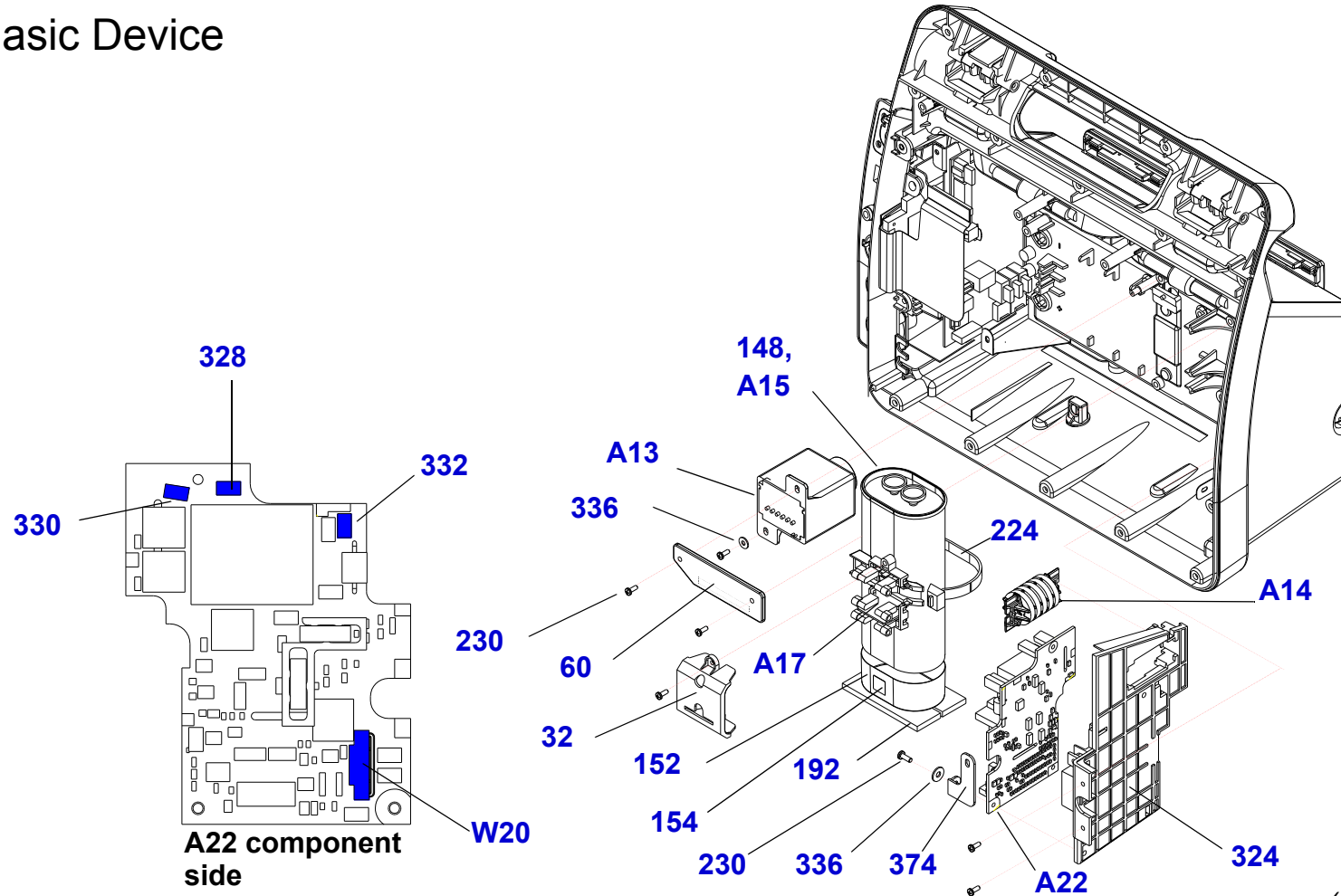


(Continued on next page)

Rear Case Assembly Diagrams *(continued)*

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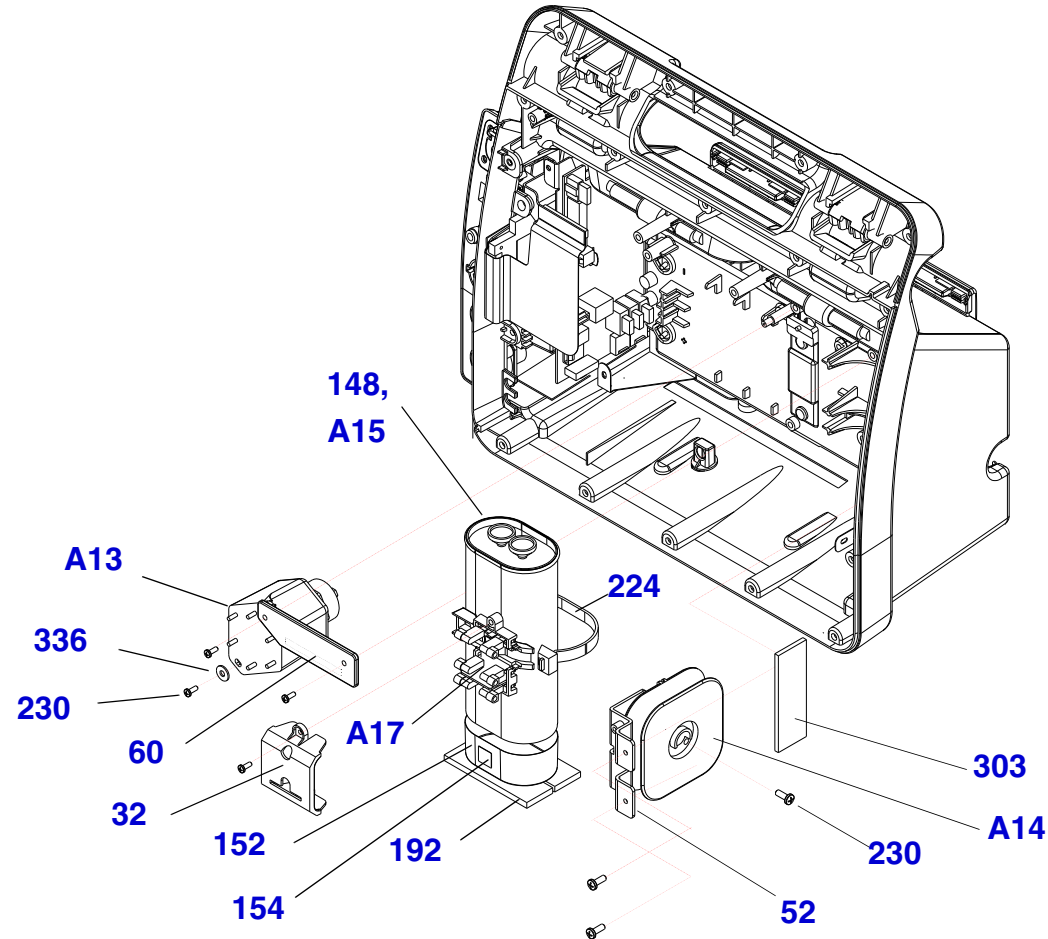
Biphasic Device

*(Continued on next page)*

Rear Case Assembly Diagrams *(continued)*

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Monophasic Device

*(Continued on next page)*

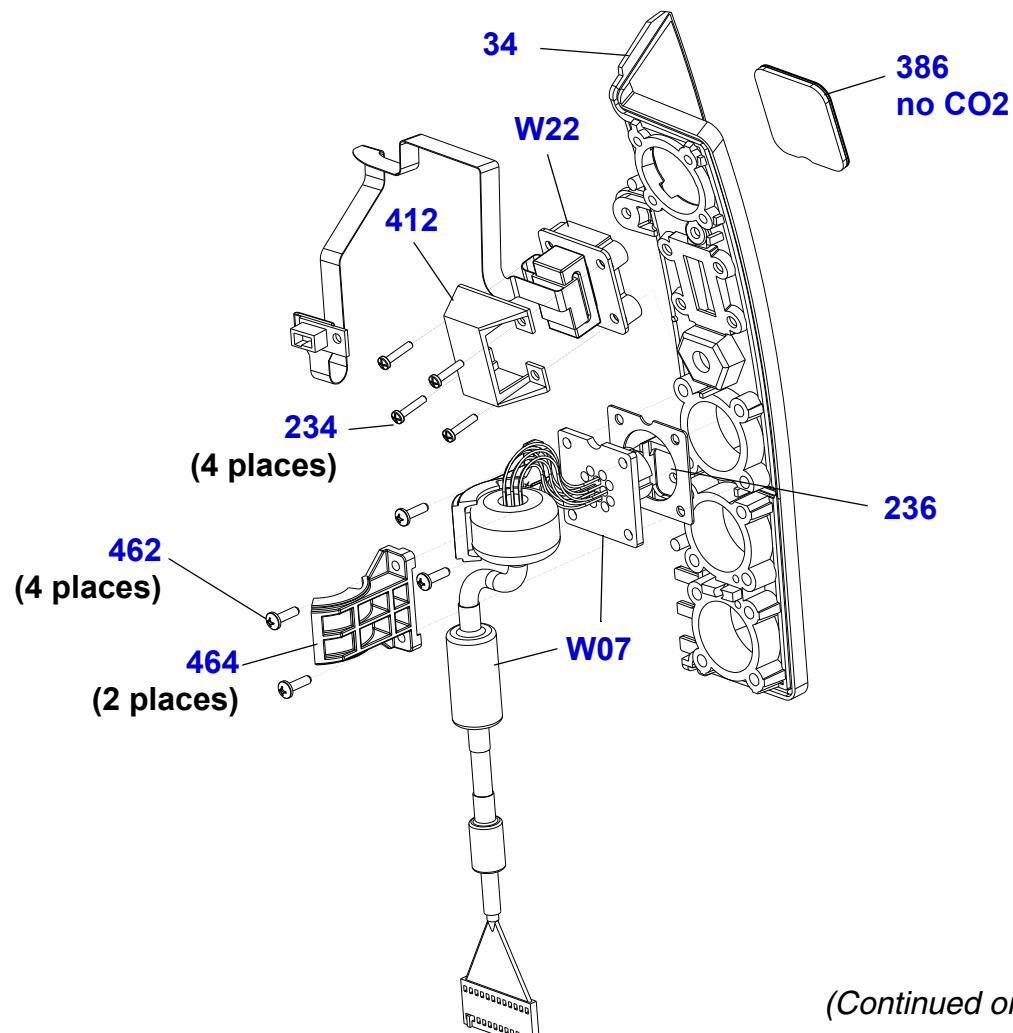
Rear Case Assembly Diagrams *(continued)*

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Bezel with ECG and Masimo SpO2

Click an item number to see the corresponding MIN (part number).

Note: This diagram reflects the device with all available options installed. Your device may not have all of these options.



(Continued on next page)

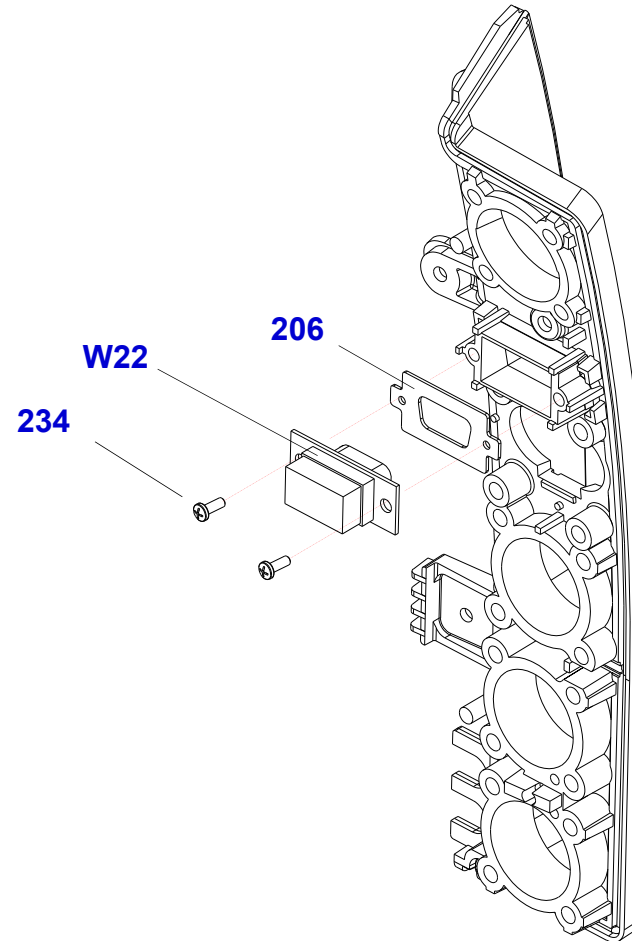
Rear Case Assembly Diagrams *(continued)*

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Bezel with Nellcor SpO2

Click an item number to see the corresponding MIN (part number).

Note: This diagram reflects the device with all available options installed. Your device may not have all of these options.



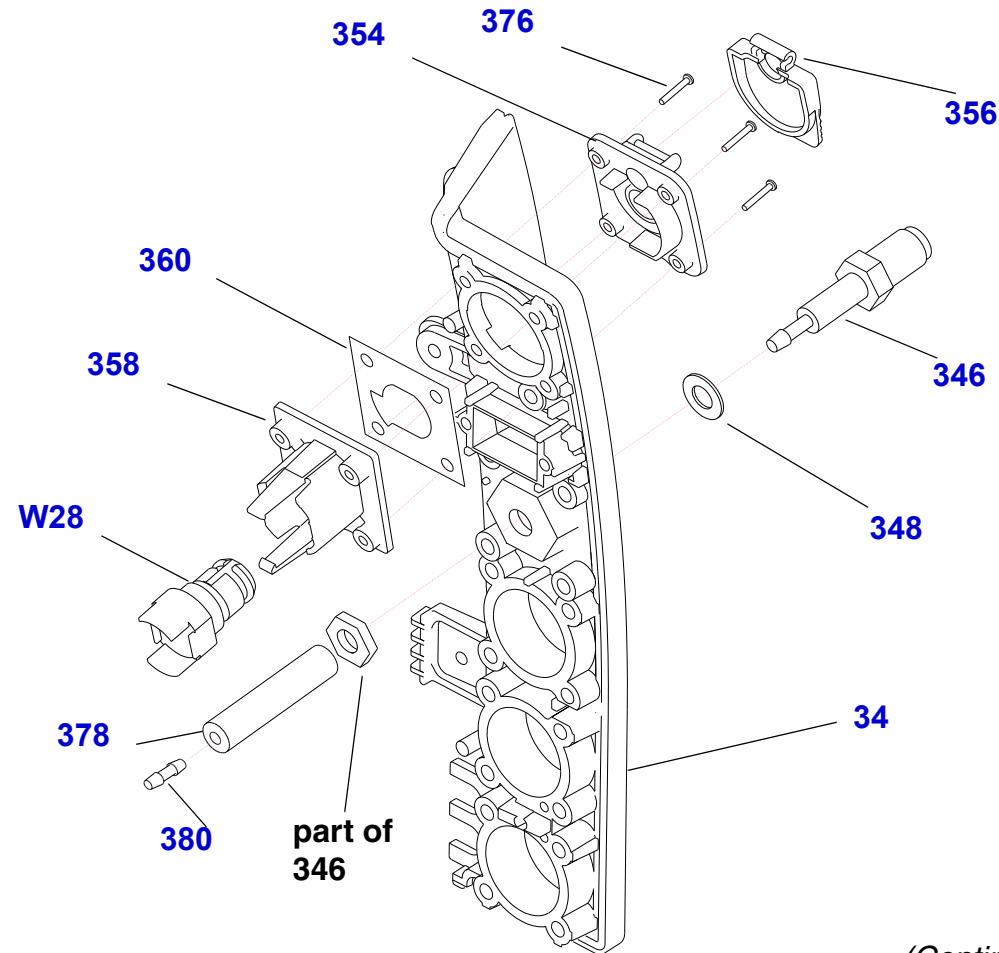
(Continued on next page)

Rear Case Assembly Diagrams *(continued)*

Bezel with CO2 and NIBP

Click an item number to see the corresponding MIN (part number).

Note: This diagram reflects the device with all available options installed. Your device may not have all of these options.



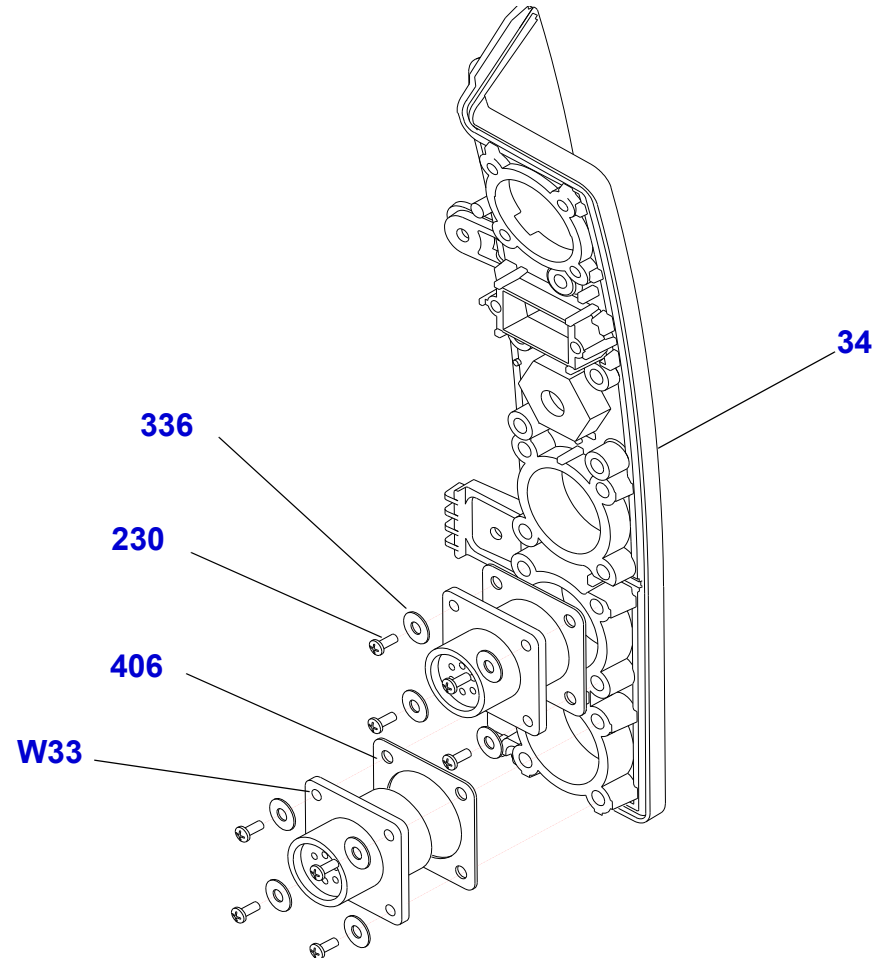
(Continued on next page)

Rear Case Assembly Diagrams *(continued)*

Bezel with IP

Click an item number to see the corresponding MIN (part number).

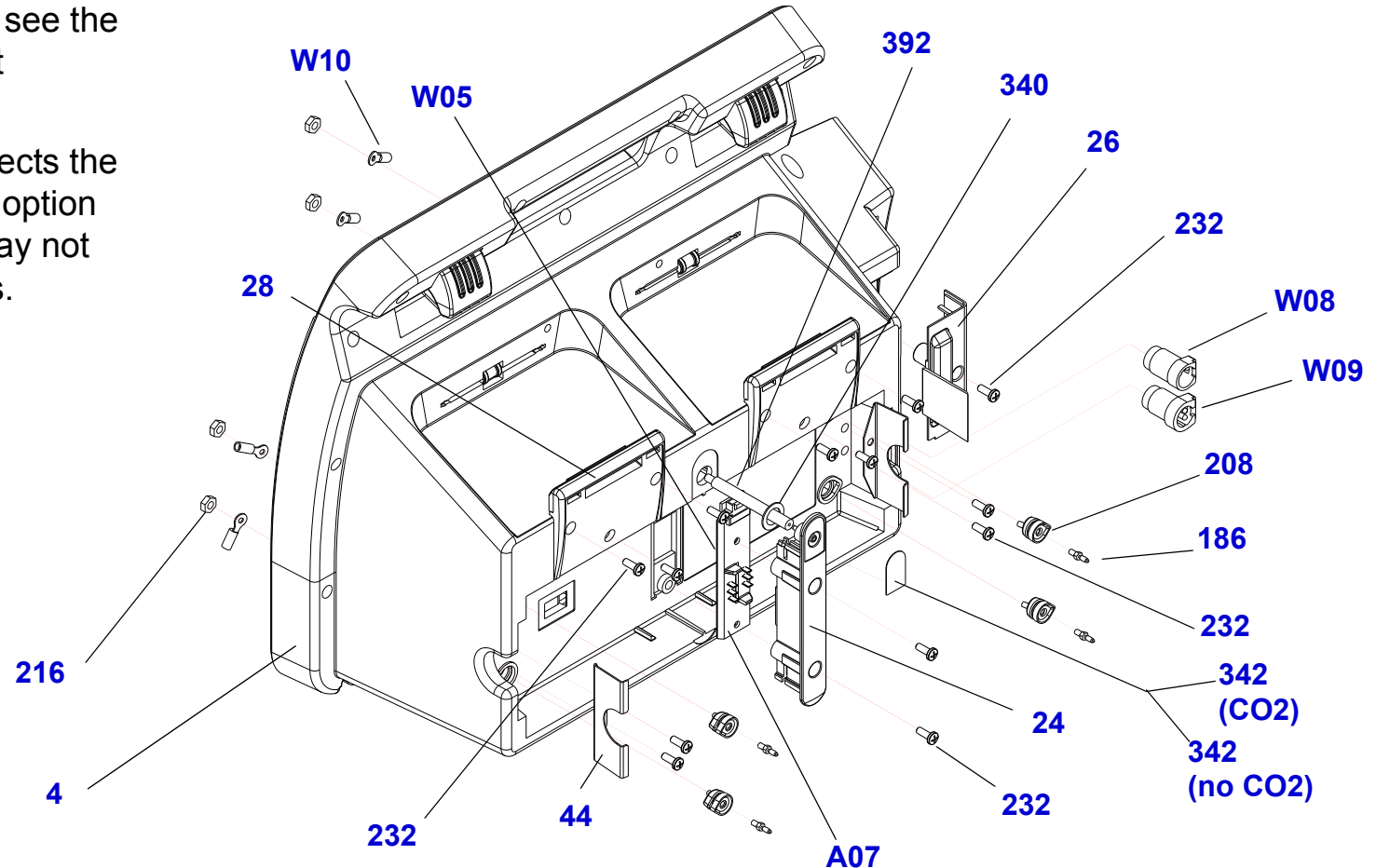
Note: This diagram reflects the device with all available options installed. Your device may not have all of these options.



Rear Case Assembly Diagrams *(continued)*

Click an item number to see the corresponding MIN (part number).

Note: This diagram reflects the device with all available option installed. Your device may not have all of these options.

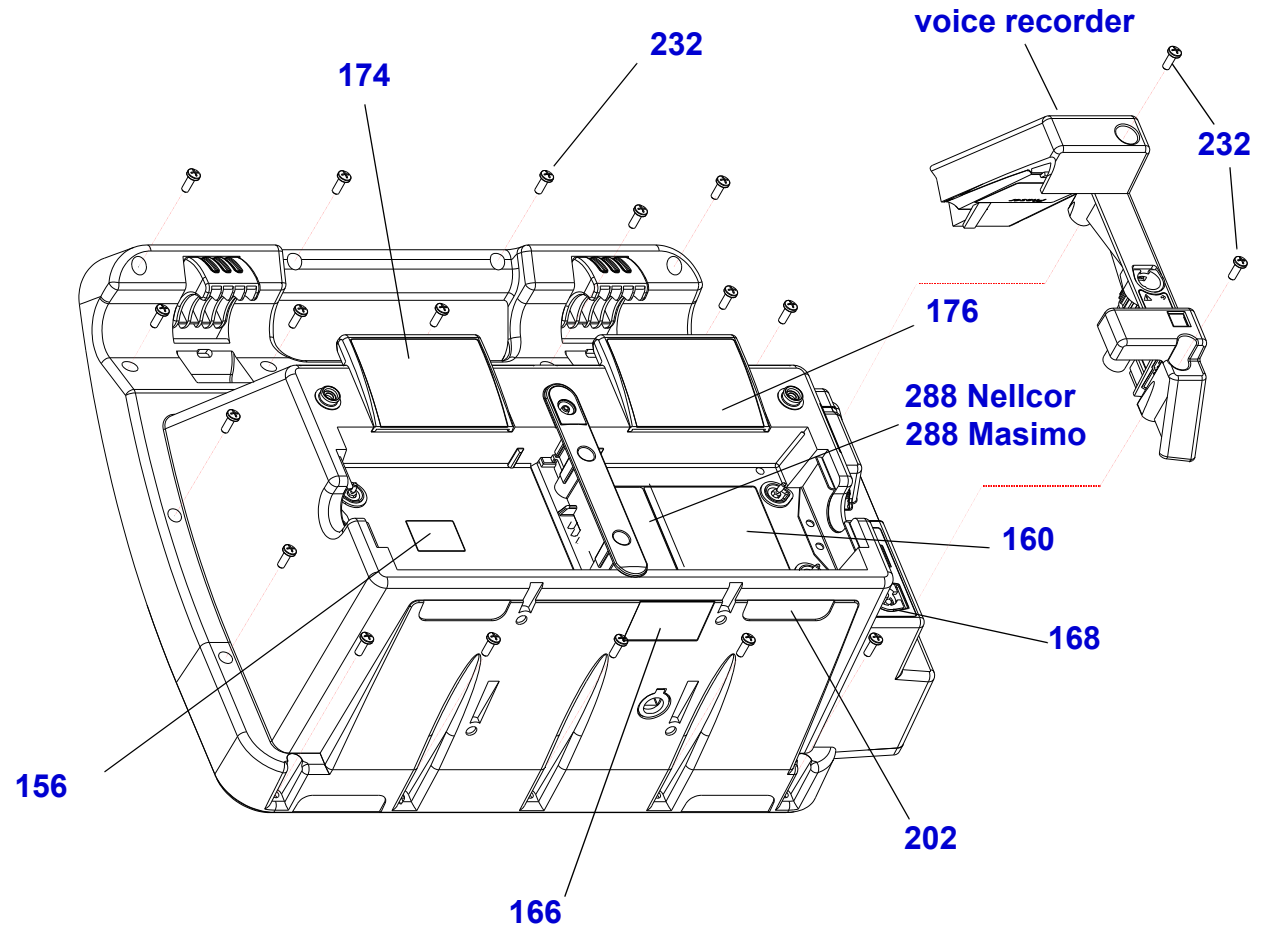


(Continued on next page)

Rear Case Assembly Diagrams *(continued)*

Click an item number to see the corresponding MIN (part number).

Note: This diagram reflects the device with all available options installed. Your device may not have all of these options.



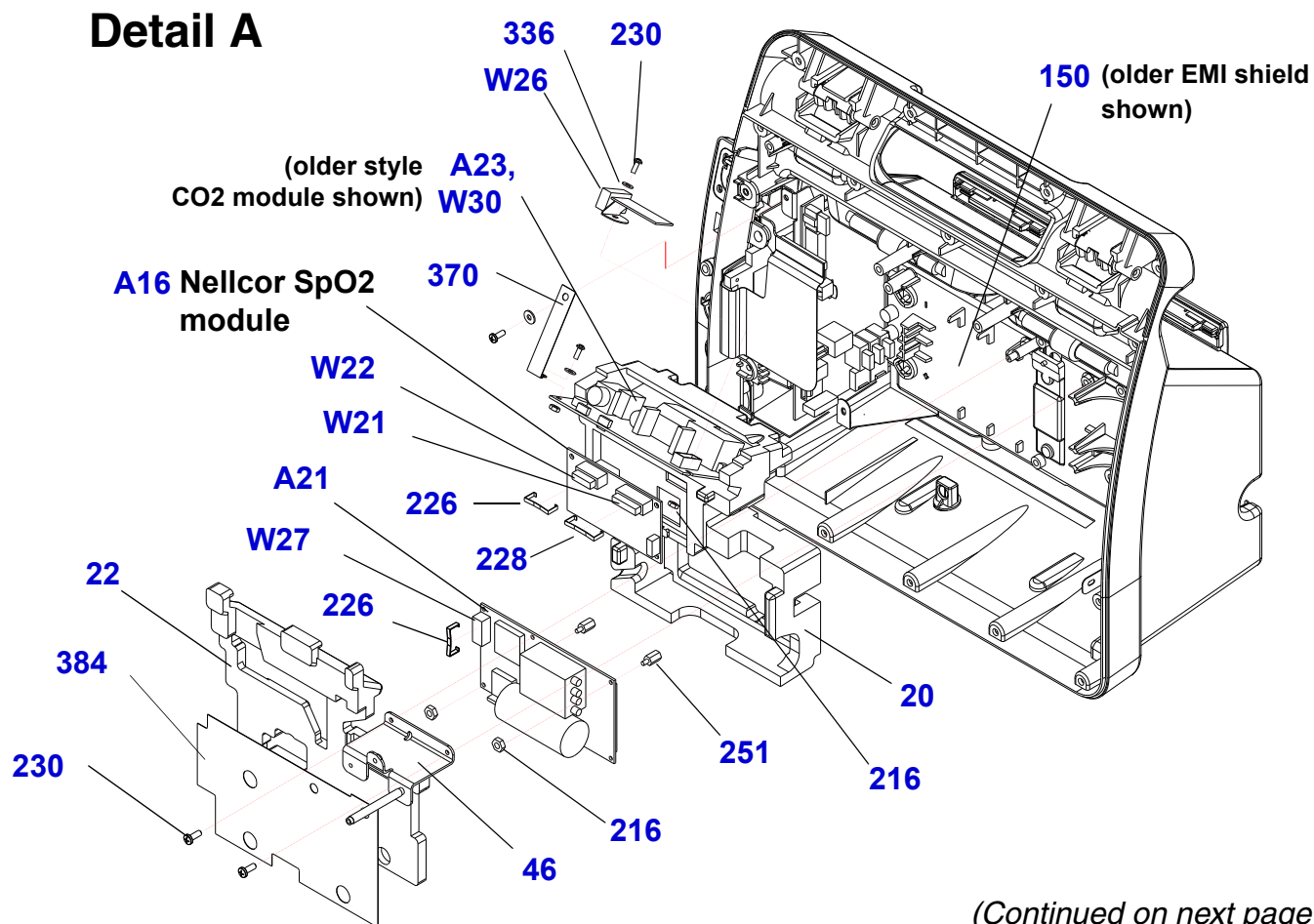
(Continued on next page)

Rear Case Assembly Diagrams *(continued)*

Nellcor Nell-3 SpO2 Module

This detail reflects the earlier product configuration, with biphasic therapy, Nellcor SpO2, the older style CO2 module, and the older EMI shield.

Note: This diagram reflects the device with all available options installed. Your device may not have all of these options.



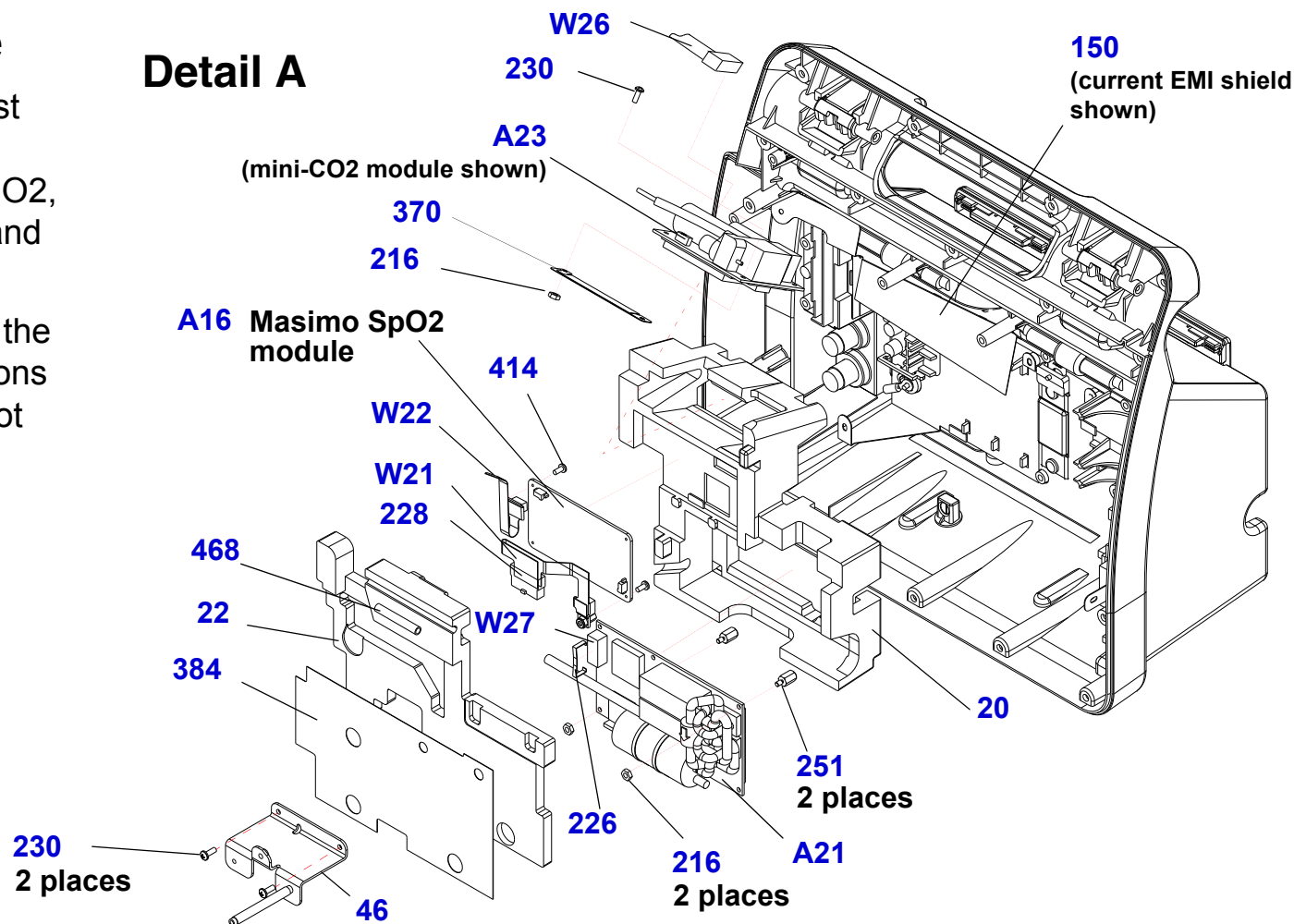
(Continued on next page)

Rear Case Assembly Diagrams *(continued)*

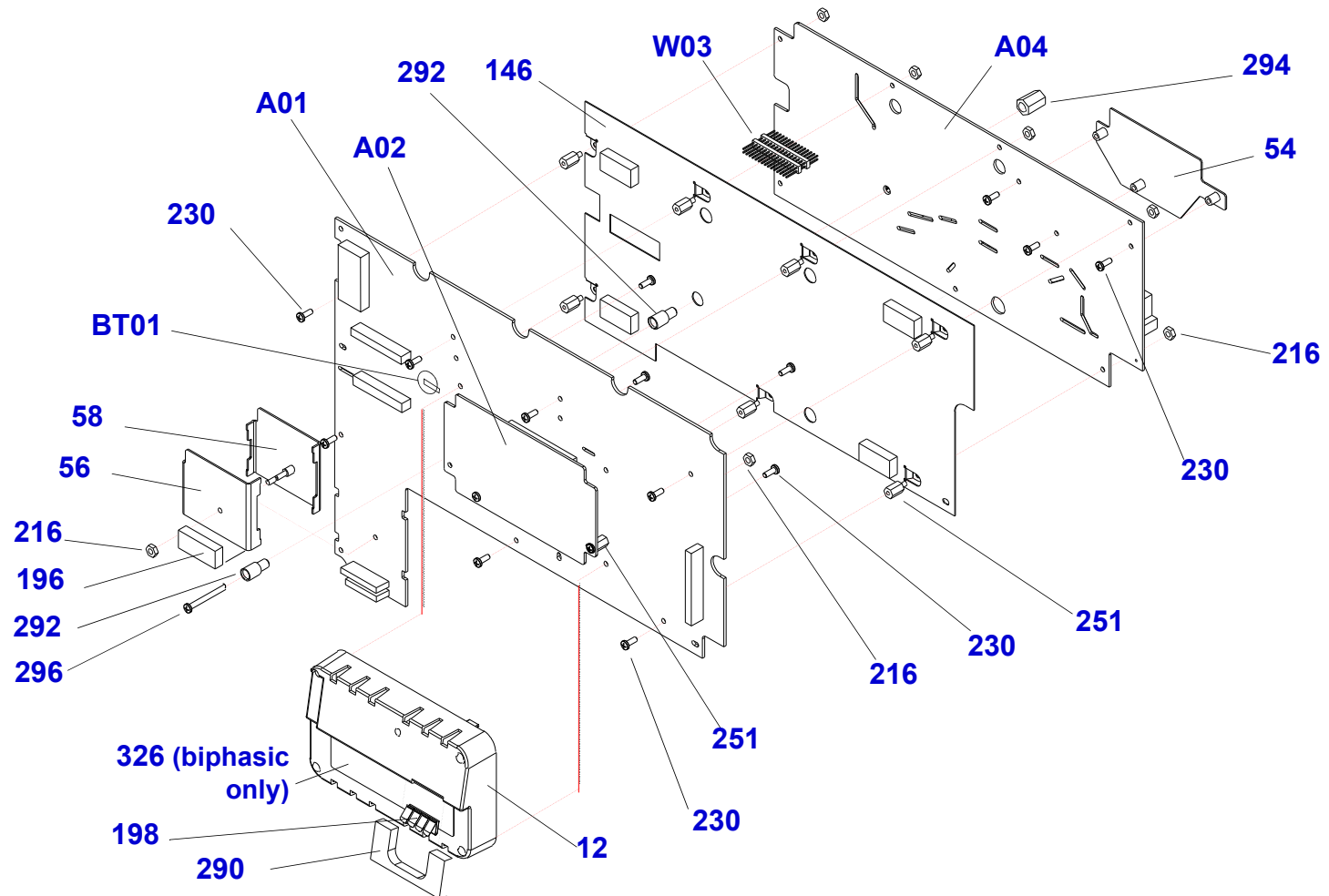
Masimo SpO2 Module

This detail reflects the newest product configuration, with biphasic therapy, Masimo SpO2, the new mini-CO2 module, and the current EMI shield.

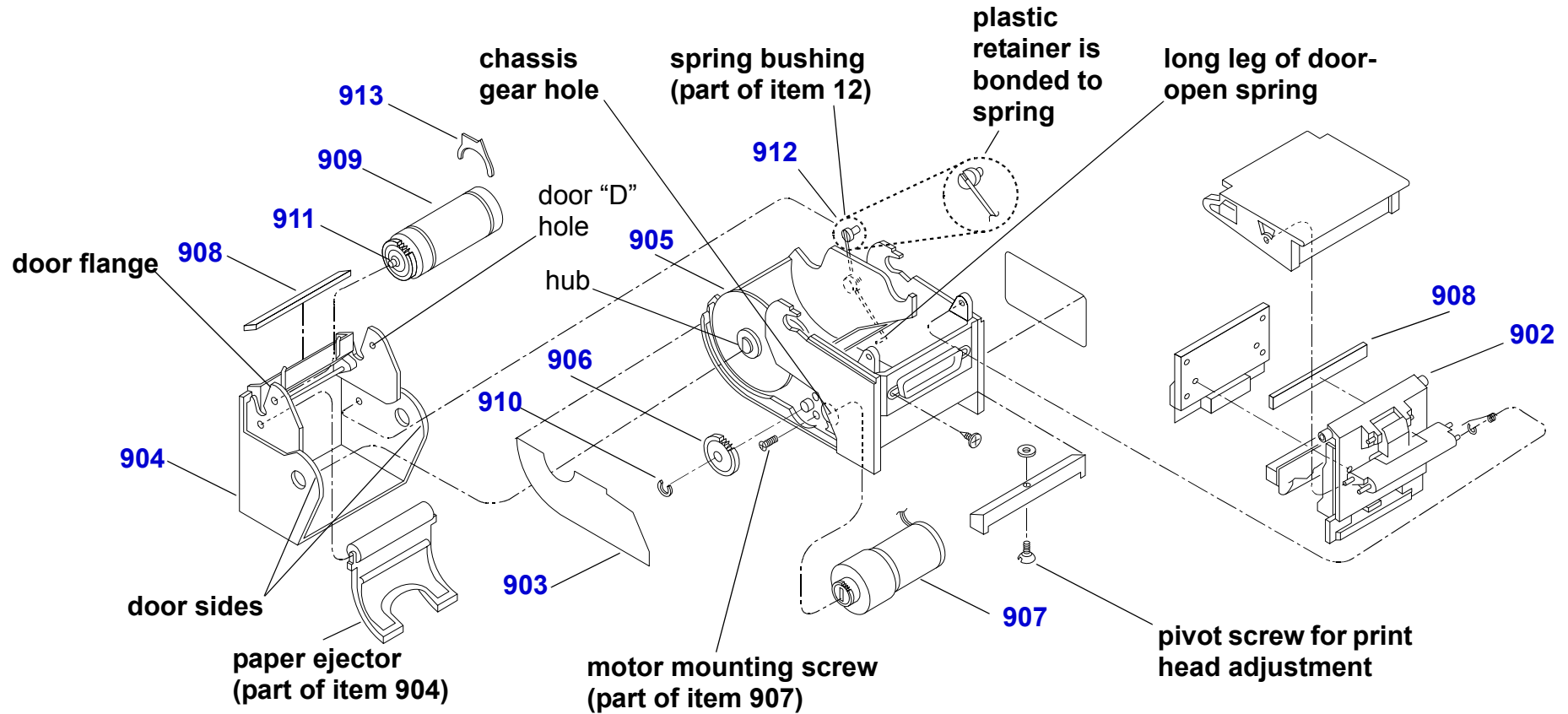
Note: This diagram reflects the device with all available options installed. Your device may not have all of these options.



System/Memory/Therapy PCB Assembly Diagram



A12 Printer (50 mm) Assembly Diagram

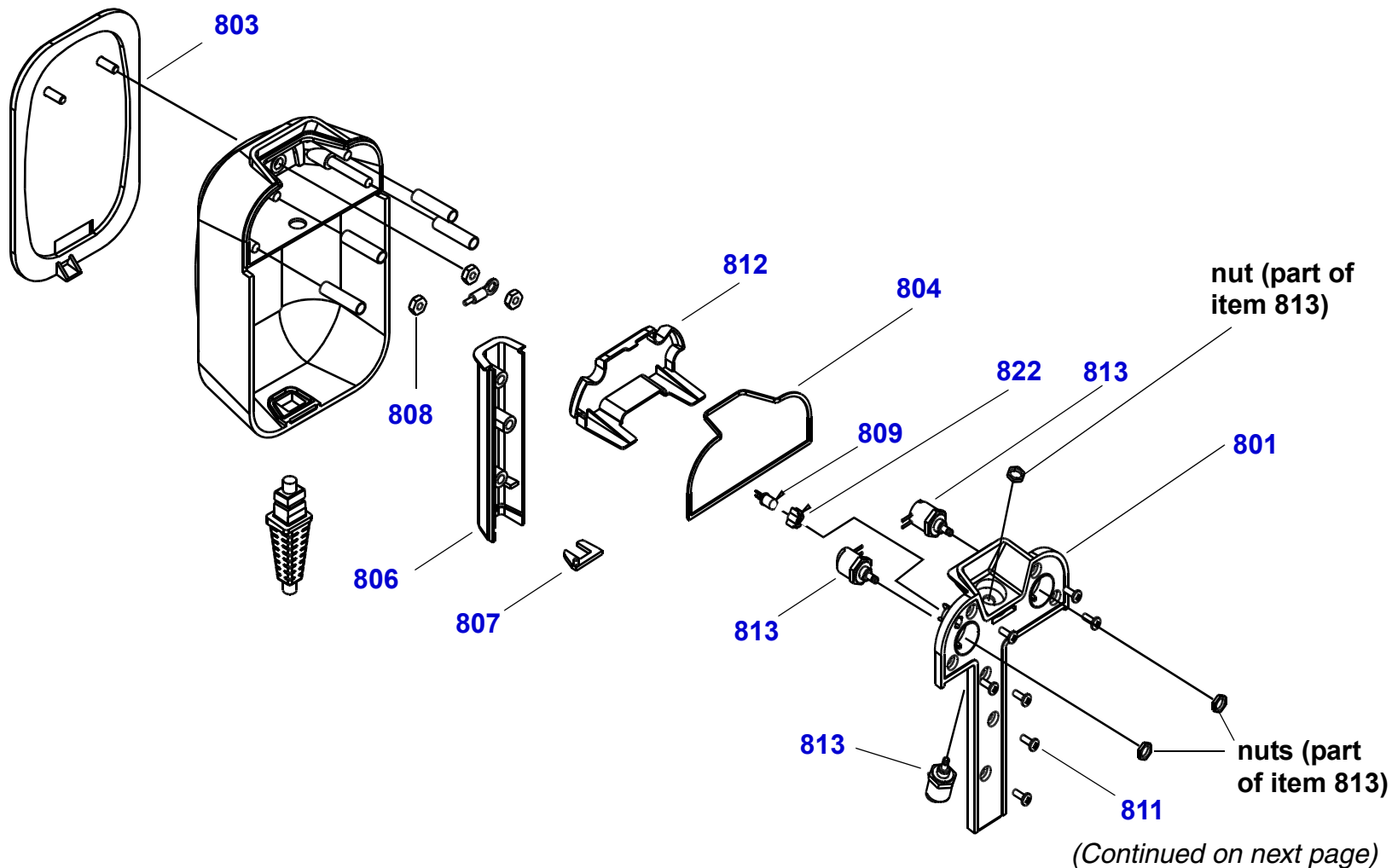


Note: Parts without item numbers are shown for reference only and are not available for replacement.

Standard Paddle Assembly Diagrams

Apex

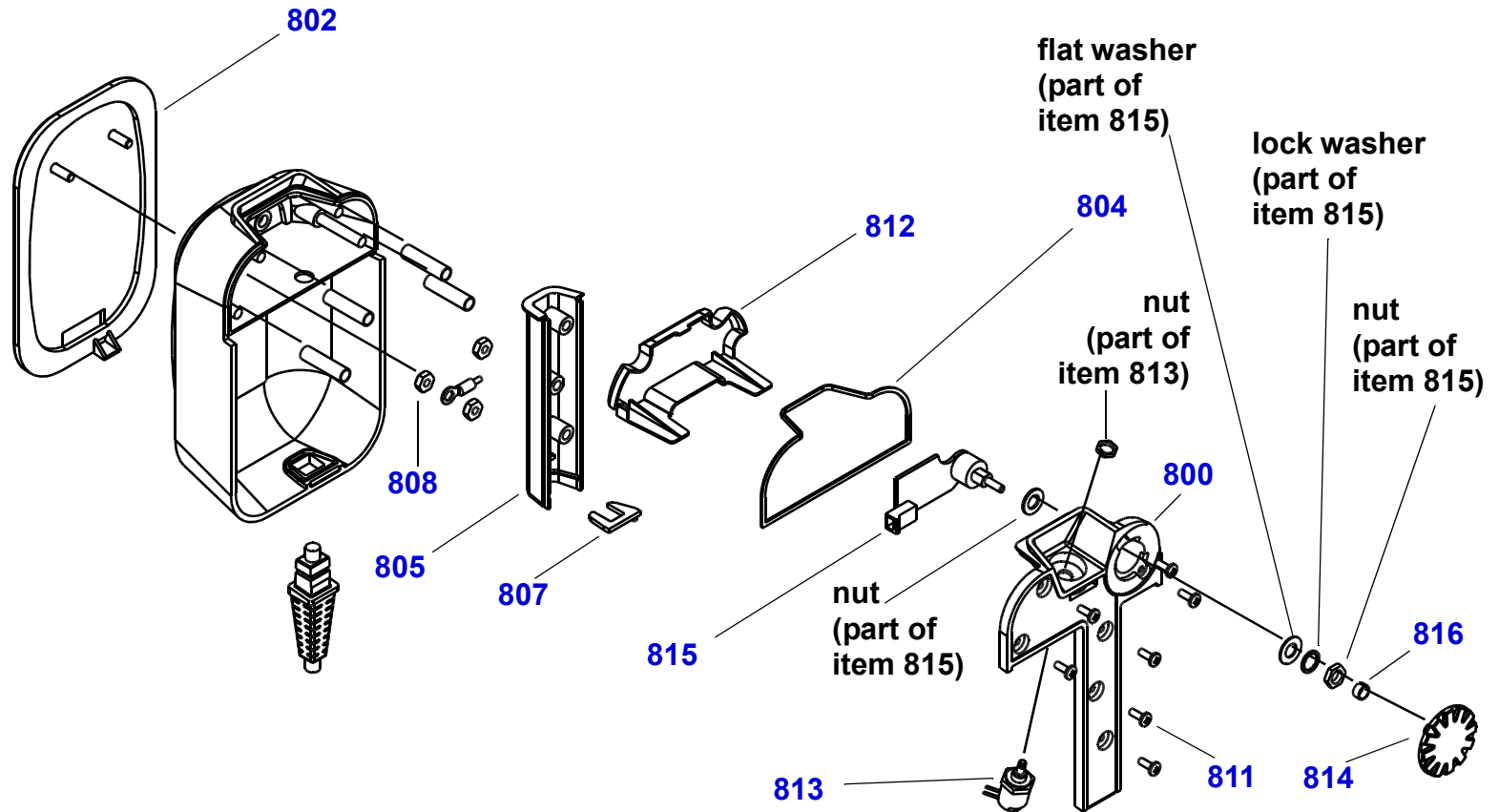
Note: See the **Parts List** for language-specific label information.



Standard Paddle Assembly Diagrams *(continued)*

Sternum

Note: See the **Parts List** for language-specific label information.



Biphasic Device Configuration Parts Lists

Basic Device with ECG Only

The specific **external** parts for a biphasic device with ECG and no other options are listed in the following table.

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 (AED - 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 (AED) 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 [see Mfg Date Note]	100 mm Printer is optional	21300-002360
A12	1	3006229-005	100-mm Printer	Repair kit, MIN 3011608-039	21300-007018
10	1	3006115-01	50-mm Printer Filler Panel		21300-001265
158	1	3006241-00	Parameter Bezel Label – English	Select other language	21501-000025
162	1	3009058-050	Product ID Label – English	Select other language	21501-000068
164	1	3009059-00	Explosion/Hazard Label – English	Select other language	21501-000078

Biphasic Device Configuration Parts Lists *(continued)*Basic Device with ECG
Only *(continued)*External Parts *(continued)*

Item	Qty	MIN	Part Description	Note	CAT.
170	1	3009064-06	Operator Instruct. Label (AED - 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 (AED) English	Select other language	21501-000096
170	1	3009064-42	Operator Instruct. Label (Manual) English	Select other language	21501-000114
178	1	3009790-00	Printer Screw Cover Label		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-xxx	Font/Voice System Software	Select language	

Biphasic Device Configuration Parts Lists *(continued)*

Nellcor SpO₂, NIBP,
CO₂, IP

The specific **internal** parts for a fully featured device with ECG, Nellcor SpO₂, NIBP, CO₂, and IP are listed in the following table.

Internal Parts					
Item	Qty	MIN	Part Description	Note	CAT.
A06	1	3008541-009	OEM PCB Assembly	View component A06	21330-000149
A16	1	3008538-002	Nell-3 SpO ₂ Module	Repair kit, MIN 3011608-046 View component A16	21300-007013
A21	1	3008943-001	NIBP Module	View component A21	21300-001338
A23	1	3012140-006	Mini-CO ₂ Module	Repair Kit, MIN 3011608-045 View component A23	21300-006948
W21	1	3009700-00	Nellcor SpO ₂ PCB/OEM PCB Cable	View component W21	21330-000162
W22	1	3007993-003	SpO ₂ Cable Assembly, Nellcor MP-205	Repair kit, MIN 3011608-023 View component W22	21330-000143
W22	1	3007993-004	SpO ₂ Cable Assembly, Nell-3	Repair kit, MIN 3011608-042 View component W22	21330-001218
W26	1	3012181-02	CO ₂ /OEM PCB Cable, CO ₂ Module	View component W26	21330-000236
W26	1	3012181-003	CO ₂ /OEM PCB Cable, Mini-CO ₂ Module	Repair kit, MIN 3011608-045 View component W26	21330-001154
W27	1	3012181-00	NIBP/OEM PCB Cable	View component W27	21330-000235
W28	1	3012140-001	CO ₂ Inlet Connector Cable, CO ₂ Module	View component W28	21300-001556

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Biphasic Device Configuration Parts Lists *(continued)*

Nellcor SpO₂, NIBP,
CO₂, IP *(continued)*

Internal Parts *(continued)*

Item	Qty	MIN	Part Description	Note	CAT.
W28	1	3012140-007	CO ₂ Inlet Connector Cable, Mini-CO ₂ Module	View component W28	21300-006949
W30	1	3012397-01	CO ₂ Adapter Cable	CO ₂ Assembly, older version	21330-000237
W33	1	3200466-01	Invasive Pressure 1 & 2 Wire Harness	View component W33	21300-001583
20	1	3012122-003	Lower Support Foam	Repair kit, MIN 3011608-024	21300-001552
20	1	3012122-004	Lower Support Foam, Mini-CO ₂ Module	Repair kit, MIN 3011608-043	21300-006946
22	1	3012123-003	Upper Support Foam	Repair kit, MIN 3011608-024	21300-001553
22	1	3012123-004	Upper Support Foam, Mini-CO ₂ Module	Repair kit, MIN 3011608-043	21300-006947
144	1	3009558-002	Option Shield	OEM Option	21300-001362
206	1	3007996-01	SpO ₂ Connector Gasket	SpO ₂ Assembly	21300-001313
216	4	201508-000	Lock Nut, 4-40	CO ₂ and NIBP Assemblies	21300-000804
226	4	3010805-000	10-pin Retainer Clip	CO ₂ , NIBP and SpO ₂ Assemblies	21300-001416
228	2	3010805-001	14-pin Retainer Clip	SpO ₂ Assembly	21300-001417
230	10	202253-761	Nylok Screw, 4-40 × .312 L	CO ₂ and IP Assemblies	21300-001038
234	2	202253-729	Nylok Screw, 2-56 × .312 L	SpO ₂ Assembly	21300-001036

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Biphasic Device Configuration Parts Lists *(continued)*

Nellcor SpO₂, NIBP,
CO₂, IP *(continued)*

Internal Parts *(continued)*

Item	Qty	MIN	Part Description	Note	CAT.
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	CO ₂ and IP Assemblies	21300-000580
346	1	3012128-000	NIBP Air Connector	NIBP Assembly	21300-001555
348	1	3007999-01	NIBP Connector Seal	NIBP Assembly	21300-001316
354	1	3012119-02	CO ₂ Connector Adapter	CO ₂ Assembly	21300-001548
358	1	3012121-01	CO ₂ Connector Retainer	CO ₂ Assembly	21300-001551
360	1	3007997-01	CO ₂ Connector Seal	CO ₂ Assembly	21300-001314
370	1	3012125-002	Ground Strap, Mini-CO ₂ Module	CO ₂ Assembly	21300-007087
376	4	202253-730	Nylok Screw, 2-56 × .375 L	CO ₂ 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	CO ₂ Exhaust Tubing	CO ₂ Assembly	21300-001557
406	2	3007998-00	Invasive Pressure Gasket	IP Assembly	21300-001315
468	1	3012140-009	Exhaust Tube Sleeve, Mini-CO ₂ Module	CO ₂ Assembly	21300-007628

(Continued on next page)

Biphasic Device Configuration Parts Lists *(continued)*

Nellcor SpO2, NIBP,
CO2, IP *(continued)*

The specific **external** parts for a fully featured device with ECG, Nellcor SpO2, NIBP, CO2, and IP are listed in the following table. See **Basic Device with ECG Only** for a list of external parts common to all devices regardless of the options or language.

External Parts					
Item	Qty	MIN	Part Description	Note	CAT.
A10	1	3006190-200	Large Keypad (Pacer - NIBP - AED) English	Select other language	21330-000120
A10	1	3006190-236	Large Keypad (Pacer - NIBP) English	Select other language	21330-000090
A10	1	3006190-272	Large Keypad (NIBP - AED) English	Select other language	21330-000107
A10	1	3006190-284	Large Keypad (Manual - NIBP) English	Select other language	21330-000725
158	1	3006241-01	Parameter Bezel Label (Nellcor) – English	Select other language	21501-000047
288	1	3011526-00	Oximeter Patent Label	SpO2 Assembly (Battery Well 1)	21501-000142
288	1	3011526-003	Oximeter Patent Label (Nell-3)	SpO2 Assembly (Battery Well 1)	21501-001725
342	1	3012178-00	CO2 Exhaust Label	CO2 Assembly	21501-000154
356	1	3012120-03	CO2 Connector Cover	CO2 Assembly	21300-001550

Biphasic Device Configuration Parts Lists *(continued)*

Masimo SpO₂, NIBP,
CO₂, IP

The specific **internal** parts for a fully featured device with Masimo SpO₂, NIBP, CO₂, and IP are listed in the following table.

Internal Parts					
Item	Qty	MIN	Part Description	Note	CAT.
A06	1	3008541-009	OEM PCB Assembly	View component A06	21330-000149
A16	1	3203421-001	Masimo SpO ₂ Module	View component A16	21300-005730
A21	1	3008943-001	NIBP Module	View component A21	21300-001338
A23	1	3012140-006	Mini-CO ₂ Module	Repair kit, MIN 3011608-045 View component A23	21300-006948
W21	1	3203607-002	Masimo SpO ₂ PCB/OEM PCB Cable	View component W21	21300-005728
W22	1	3203369-000	Masimo SpO ₂ Cable Assembly	Repair kit, MIN 3011608-026 View component W22	21300-005729
W26	1	3012181-02	CO ₂ /OEM PCB Cable, CO ₂ Module	View component W26	21330-000236
W26	1	3012181-003	CO ₂ /OEM PCB Cable, Mini-CO ₂ Module	View component W26	21330-001154
W27	1	3012181-00	NIBP/OEM PCB Cable	View component W27	21330-000235
W28	1	3012140-001	CO ₂ Inlet Connector Cable, CO ₂ Module	View component W28	21300-001556
W28	1	3012140-007	CO ₂ Inlet Connector Cable, Mini-CO ₂ Module	View component W28	21300-006949
W33	1	3200466-01	Invasive Pressure 1 & 2 Wire Harness	View component W33	21300-001583

Biphasic Device Configuration Parts Lists *(continued)*Masimo SpO₂, NIBP,
CO₂, IP *(continued)*Internal Parts *(continued)*

Item	Qty	MIN	Part Description	Note	CAT.
20	1	3012122-003	Lower Support Foam	Repair kit, MIN 3011608-024	21300-001552
20	1	3012122-004	Lower Foam, Mini-CO ₂ Module	Repair kit, MIN 3011608-043	21300-006946
22	1	3012123-003	Upper Support Foam	Repair kit, MIN 3011608-024	21300-001553
22	1	3012123-004	Upper Foam, Mini-CO ₂ Module	Repair kit, MIN 3011608-043	21300-006947
144	1	3009558-002	Option Shield	OEM Option	21300-001362
216	4	201508-000	Lock Nut, 4-40	CO ₂ and NIBP Assemblies	21300-000804
226	3	3010805-000	10-pin Retainer Clip	CO ₂ and NIBP Assemblies	21300-001416
228	1	3203920-000	Clip Retainer, AMP Connector	SpO ₂ Assembly	21300-006037
230	10	202253-761	Nylok Screw, 4-40 × .312 L	CO ₂ and IP Assemblies	21300-001038
234	4	3205311-000	Pan Torx, Nylok Screw, 4-40 × .500 L	SpO ₂ Assembly	21300-006102
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	CO ₂ 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

Biphasic Device Configuration Parts Lists *(continued)*

Masimo SpO₂, NIBP,
CO₂, IP *(continued)*

Internal Parts *(continued)*

Item	Qty	MIN	Part Description	Note	CAT.
354	1	3012119-02	CO ₂ Connector Adapter	CO ₂ Assembly	21300-001548
358	1	3012121-01	CO ₂ Connector Retainer	CO ₂ Assembly	21300-001551
360	1	3007997-01	CO ₂ Connector Seal	CO ₂ Assembly	21300-001314
370	1	3012125-002	Ground Strap, Mini-CO ₂ Module	CO ₂ Assembly	21300-007078
376	4	202253-730	Nylok Screw, 2-56 × .375 L	CO ₂ 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	CO ₂ Exhaust Tubing	CO ₂ Assembly	21300-001557
406	2	3007998-00	Invasive Pressure Gasket	IP Assembly	21300-001315
412	1	3203956-000	Housing - Ferrite, LIFEPAK 12	Masimo SpO ₂ Assembly	21300-006089
414	2	202253-760	Nylok Screw, 4-40 x .250 L	Masimo SpO ₂ Assembly	21300-006251
466	1	3206424-000	Cable Tie Mount		21300-006590
468	1	3012140-009	Exhaust Tube Sleeve, Mini-CO ₂ Module	CO ₂ Assembly	21300-007628

Biphasic Device Configuration Parts Lists *(continued)*Masimo SpO2, NIBP,
CO2, IP *(continued)*

The specific **external** parts for a fully featured device with Masimo SpO2, NIBP, CO2, and IP are listed in the following table. See **Basic Device with ECG Only** for a list of external parts common to all devices regardless of the options or language.

External Parts

Item	Qty	MIN	Part Description	Note	CAT.
A10	1	3006190-200	Large Keypad (Pacer - NIBP - AED) English	Select other language	21330-000120
A10	1	3006190-236	Large Keypad (Pacer - NIBP) English	Select other language	21330-000090
A10	1	3006190-272	Large Keypad (NIBP - AED) English	Select other language	21330-000107
A10	1	3006190-284	Large Keypad (Manual - NIBP) English	Select other language	21330-000725
158	1	3006241-084	Parameter Bezel Label (Masimo) – English	Select other language	21501-001171
288	1	3011526-001	Oximeter 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

Front Case Parts Lists

Common Front Case Parts

The following parts are common to all devices regardless of the options or language.

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	3006216-005	Therapy Connector Cable	Repair kit, MIN 3011608-037 View component W11	21330-001103
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
W15	1	3011128-002	Selector Assembly (with nut and washer)	View component W15	21300-003713
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	Physio-Control Icon Label		21501-000121
190	1	3006245-00	Speaker Assembly Felt		21300-001282

Front Case Parts Lists *(continued)*

Common Front Case Parts *(continued)*

Item	Qty	MIN	Part Description	Note	CAT.
204	1	3006809-00	Printer Connector Gasket		21300-001299
218	1	200040-001	Therapy Connector Cable Snap Ring		21300-000149
230	15	202253-761	Nylok Screw, 4-40 x .312 L		21300-001038
232	3	201407-069	Nylok 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

Front Case Parts Lists *(continued)*

LCD Device Parts Only

See [Common Front Case Parts](#) for a list of parts common to all devices regardless of the options or language.

Item	Qty	MIN	Part Description	Note	CAT.
A08	1	3006806-00	Backlight PCB	Repair kit, MIN 3011608-04 View component A08	21330-000673
A11	1	3010612-002	LCD Assembly	Repair kit, MIN 3011608-040 View component A11	21300-007509
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, LCD	Repair kit, MIN 3011608-00	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
212	1	3006186-04	LCD Lens	Repair kit, MIN 3011608-00	21300-001271
222	2	200536-001	Self-locking Cable Tie .10 W × 4.0 L		21300-000499

Front Case Parts Lists *(continued)*

LCD Device Parts Only *(continued)*

Item	Qty	MIN	Part Description	Note	CAT.
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
467	1	3207835-000	LCD Metal Case	Repair kit, MIN 3011608-040	21300-007510

Front Case Parts Lists *(continued)*

EL Display Device Parts Only

See [Common Front Case Parts](#) for a list of parts common to all devices regardless of the options or language.

Item	Qty	MIN	Part Description	Note	CAT.
A11	1	3012695-001	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, EL Display	Repair kit, MIN 3011608-025	11220-000007
42	1	3012696-01	EL Display Bracket		21300-001577
212	1	3006186-008	EL Display Lens	Repair kit, MIN 3011608-025	21300-005804
336	4	200804-102	Flat Washer .312 OD x .125 ID		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

System/Memory/Therapy PCB Assembly Parts List

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	3006227-08	System PCB	View component A01	21300-000128
A02	1	3008520-07	Memory PCB	Replaces MIN 3008520-04 View component A02	21330-000147
A04	1	3006235-012	Therapy PCB—Monophasic Devices	View component A04	21330-001279
A04	1	3006235-014	Therapy PCB—Biphasic Devices	Repair kit, MIN 3011608-044 View component A04	21330-000129
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

System/Memory/Therapy PCB Assembly Parts List

Page 2 of 2

(continued)

Item	Qty	MIN	Part Description	Note	CAT.
230	14	202253-761	Nylok Screw, 4-40 x .312 L		21300-001038
251	9	200266-006	Hex Standoff, 4-40 x .250 W x .375 L		21300-000320
290	1	804447-34	Adhesive Part, 1.0 W x 3.5 H x .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	Nylok Screw, 4-40 x 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 Parts Lists

Common Rear Case Parts

The following parts are common to all devices regardless of options or language.

Item	Qty	MIN	Part Description	Note	CAT.
A03	1	3006237-009	Power PCB	View component A03	21330-000130
		3010749-006	Three replaceable fuses: 15A, 32V (F1, F2, F4)	See fuse replacement procedure	21300-001410
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	Repair kit, MIN 3011608-045 View component W01	21330-000159
W02	1	3009726-05	A03 Power PCB/A04 Therapy PCB Cable	View component W02	21300-001373
W05	1	3009678-007	A03 Power PCB/A07 Contact PCB Cable	View component W05	21330-000160
W07	1	3007991-005	ECG Connector Cable	Repair kit, MIN 3011608-036 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
4	1	3006114-006	Rear Case	Repair kit, MIN 3011608-041	11220-000008

Rear Case Parts Lists *(continued)*Common Rear Case
Parts *(continued)*

Item	Qty	MIN	Part Description	Note	CAT.
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	Can be used with Bluetooth card	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		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

Rear Case Parts Lists *(continued)*Common Rear Case
Parts *(continued)*

Item	Qty	MIN	Part Description	Note	CAT.
150	1	3010591-010	EMI Shield (CO2 Module)		21300-001405
150	1	3010591-011	EMI Shield (Mini-CO2 Module)		21300-006945
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 Label		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 capacitor pad, 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

Rear Case Parts Lists *(continued)*Common Rear Case
Parts *(continued)*

Item	Qty	MIN	Part Description	Note	CAT.
216	4	201508-000	Carbon Steel Lock Nut, 4-40 Thread		21300-000804
220	2	805487-00	Rear Connector Seal Plate		21300-002650
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	Nylok Screw, 4-40 × .312 L		21300-001038
232	35	201407-069	Nylok Screw, 6-32 × .375 L		21300-000777
234	4	202253-729	Nylok 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
340	1	3012209-00	CO2 Exhaust Seal		21300-001563
398	1	804447-35	Foam Spacer, Modem flex		21300-005557
462	7	202253-763	Nylok Screw, 4-40 × .437 L		21300-006965
464	2	3205680-001	Cable Support Bracket Assembly		21300-006304

Rear Case Parts Lists *(continued)*

Biphasic Parts

The following parts are common to biphasic devices only. See [Common Rear Case Parts](#) for a list of parts common to all 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	3010178-010	Biphasic Module	View component A22	21330-000176
W20	1	3011792-005	Biphasic to Therapy PCB Flex Cable	View component W20	21300-001528
324	1	3011589-03	Biphasic Module 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

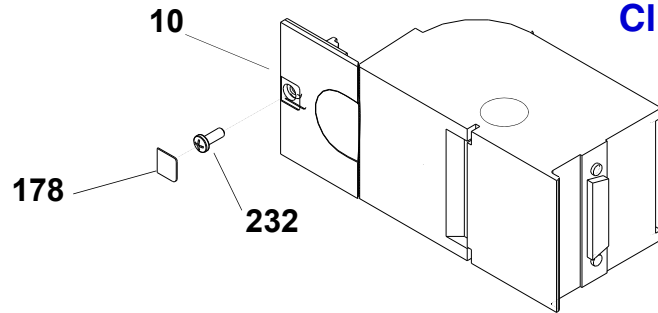
Rear Case Parts Lists *(continued)*

Monophasic Parts

The following parts are common to monophasic devices only. See [Common Rear Case Parts](#) for a list of parts common to all devices regardless of options or language.

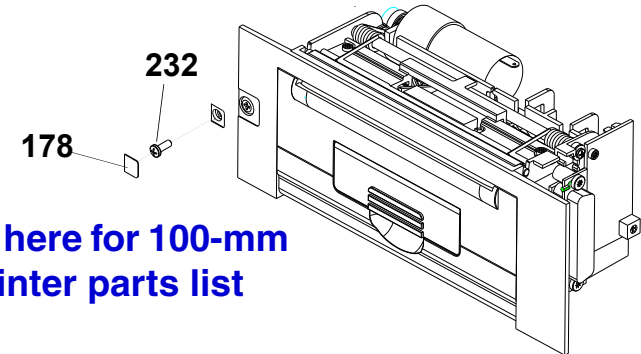
Item	Qty	MIN	Part Description	Note	CAT.
A13	1	3006219-01	Transfer Relay Assembly	View component A13	21300-001274
A14	1	3006221-01	Waveshaping Inductor	View component A14	21300-001276
A15	1	3006220-01	Energy Storage Capacitor	View component A15	21300-001275
52	1	3007005-02	A14 Waveshaping Inductor Bracket		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



A12 50-mm printer

[Click here for 50-mm printer parts list](#)



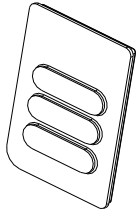
A12 100-mm printer

[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	3006229-005	100-mm Printer		21300-007018
10	1	3006115-01	50-mm Printer Filler Panel		21300-001265
178	1	3009790-00	50-mm Printer Screw Cover		21501-000126
232	3	201407-069	Nylok Screw, 6-32 × .375 L		21300-000777

A09 Small Keypad Language

A09

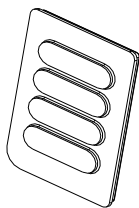


Without 12-Lead

Item	Qty	MIN	Part Description	Note	CAT.
A09	1	3006189-01	Small Keypad – English	Without 12-Lead	21330-000045
A09	1	3006189-03	Small Keypad – German	Without 12-Lead	21330-000047
A09	1	3006189-05	Small Keypad – French	Without 12-Lead	21330-000049
A09	1	3006189-07	Small Keypad – Spanish	Without 12-Lead	21330-000051
A09	1	3006189-09	Small Keypad – Italian	Without 12-Lead	21330-000053
A09	1	3006189-11	Small Keypad – Swedish	Without 12-Lead	21330-000055
A09	1	3006189-13	Small Keypad – Danish	Without 12-Lead	21330-000056
A09	1	3006189-15	Small Keypad – Portuguese	Without 12-Lead	21330-000977
A09	1	3006189-17	Small Keypad – Norwegian	Without 12-Lead	21330-000059
A09	1	3006189-19	Small Keypad – Dutch	Without 12-Lead	21330-000061
A09	1	3006189-21	Small Keypad – Polish	Without 12-Lead	21330-000063
A09	1	3006189-23	Small Keypad – Finnish	Without 12-Lead	21330-000065
A09	1	3006189-024	Small Keypad – Japanese	Without 12-Lead	21330-000925

A09 Small Keypad Language *(continued)*

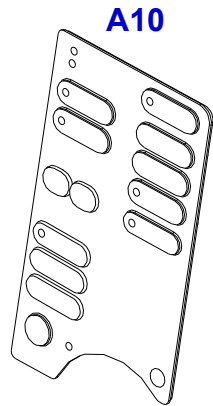
A09



With 12-Lead

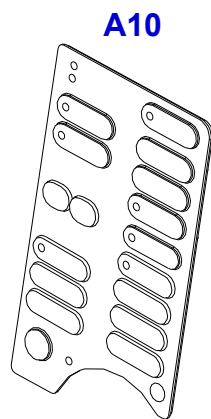
Item	Qty	MIN	Part Description	Note	CAT.
A09	1	3006189-00	Small Keypad – English	With 12-Lead	21330-000044
A09	1	3006189-02	Small Keypad – German	With 12-Lead	21330-000046
A09	1	3006189-04	Small Keypad – French	With 12-Lead	21330-000048
A09	1	3006189-06	Small Keypad – Spanish	With 12-Lead	21330-000050
A09	1	3006189-08	Small Keypad – Italian	With 12-Lead	21330-000052
A09	1	3006189-10	Small Keypad – Swedish	With 12-Lead	21330-000054
A09	1	3006189-12	Small Keypad – Danish	With 12-Lead	21330-000976
A09	1	3006189-14	Small Keypad – Portuguese	With 12-Lead	21330-000057
A09	1	3006189-16	Small Keypad – Norwegian	With 12-Lead	21330-000058
A09	1	3006189-18	Small Keypad – Dutch	With 12-Lead	21330-000060
A09	1	3006189-20	Small Keypad – Polish	With 12-Lead	21330-000062
A09	1	3006189-025	Small Keypad – Japanese	With 12-Lead	21330-000926

A10 Large Keypad Language



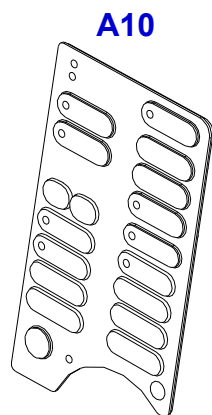
**No Pacer,
No NIBP,
With AED**

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

A10 Large Keypad Language *(continued)*

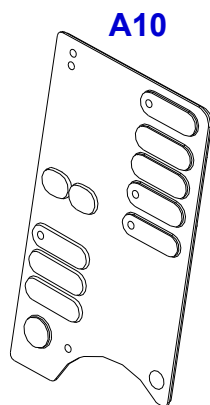
**With Pacer,
No NIBP,
With AED**

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

A10 Large Keypad Language *(continued)*

**With Pacer,
With NIBP,
With AED**

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

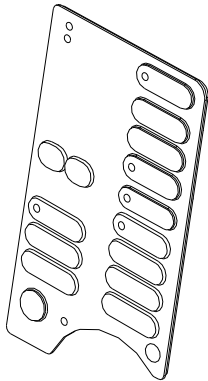
A10 Large Keypad Language *(continued)*

**No Pacer,
No NIBP,
No AED**

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

A10 Large Keypad Language *(continued)*

A10

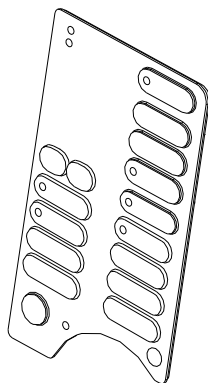


**With Pacer,
No NIBP,
No AED**

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

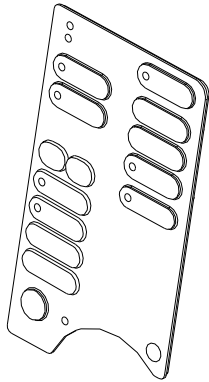
A10 Large Keypad Language *(continued)*

A10



**With Pacer,
With NIBP,
No AED**

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

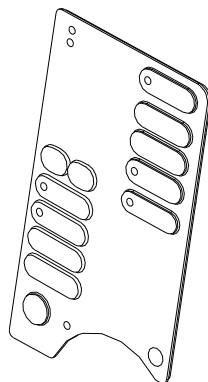
A10 Large Keypad Language *(continued)***A10**

**No Pacer,
With NIBP,
With AED**

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

A10 Large Keypad Language *(continued)*

A10



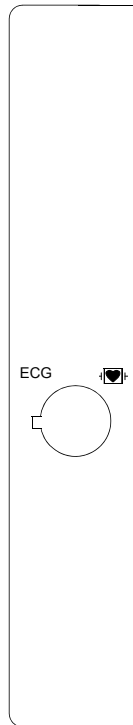
**No Pacer,
With NIBP,
No AED**

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

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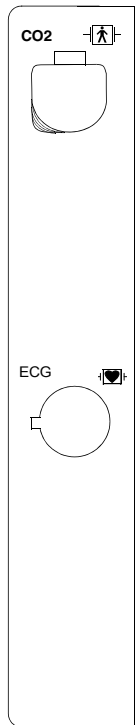
No Options

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

(Continued on next page)

Parameter Bezel Label Language *(continued)*

158

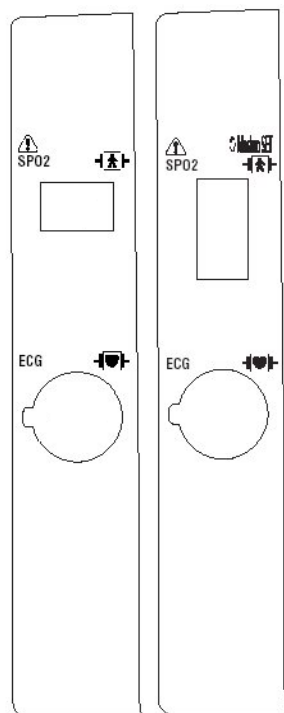


With CO2

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

Parameter Bezel Label Language *(continued)*

158



Nellcor

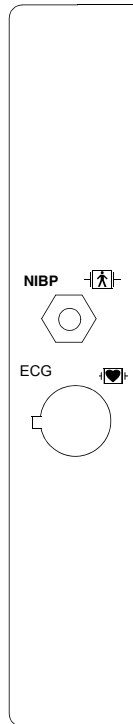
Masimo

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

Parameter Bezel Label Language *(continued)*

158

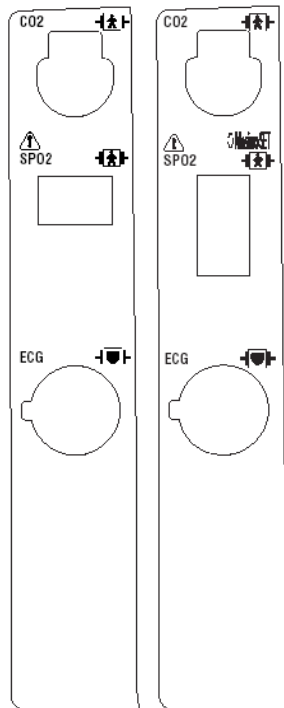


With
NIBP

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

Parameter Bezel Label Language *(continued)*

158



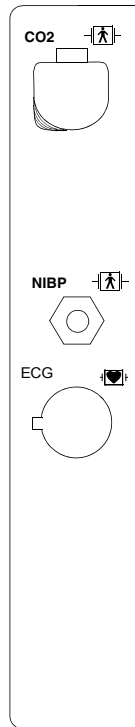
Nellcor Masimo

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

Parameter Bezel Label Language *(continued)*

158



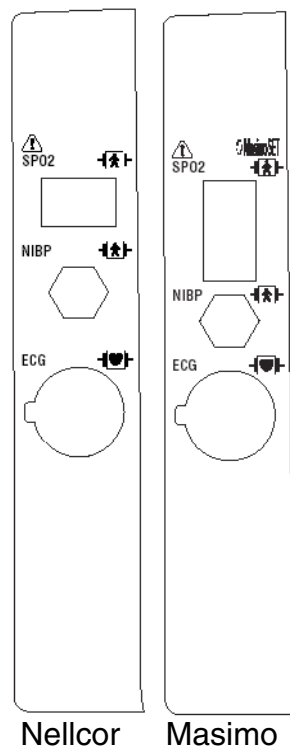
With CO2
and NIBP

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

(Continued on next page)

Parameter Bezel Label Language *(continued)*

158

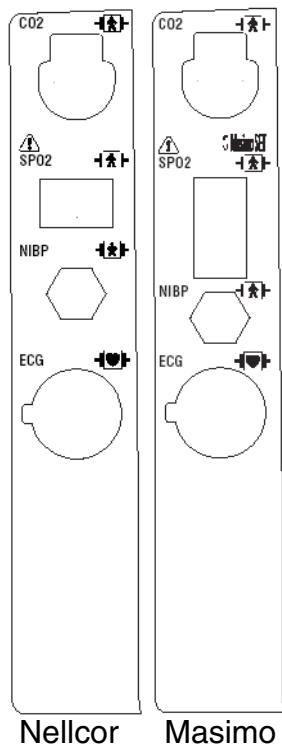


With SpO2
and NIBP

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

Parameter Bezel Label Language *(continued)*

158

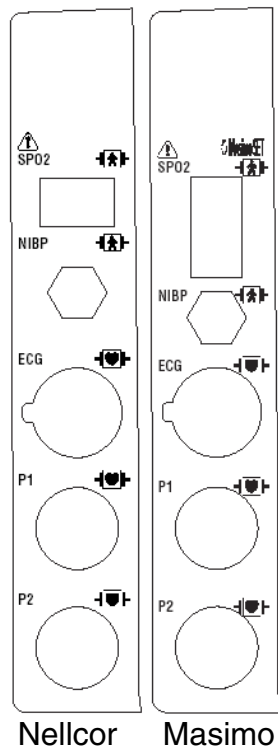


**With CO2,
SpO2, and NIBP**

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

Parameter Bezel Label Language *(continued)*

158

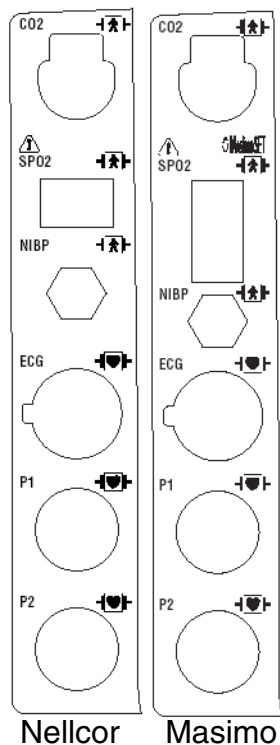


With SpO2,
NIBP, and IP

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

Parameter Bezel Label Language *(continued)*

158

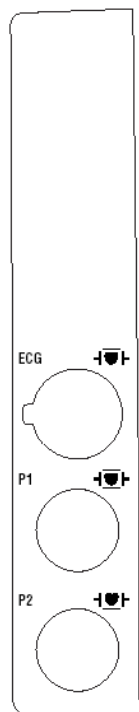


With CO₂, SpO₂,
NIBP, and IP

Item	Qty	MIN	Part Description	Note	CAT.
158	1	3006241-40	Parameter Bezel Label – English, Dutch, Polish, and Japanese	Nellcor SpO ₂	21501-000047
158	1	3006241-42	Parameter Bezel Label – German, Swedish, Danish, Norwegian, and Finnish	Nellcor SpO ₂	21501-000722
158	1	3006241-41	Parameter Bezel Label – French	Nellcor SpO ₂	21501-000048
158	1	3006241-43	Parameter Bezel Label – Spanish, and Portuguese	Nellcor SpO ₂	21501-001212
158	1	3006241-44	Parameter Bezel Label – Italian	Nellcor SpO ₂	21501-001213
158	1	3006241-094	Parameter Bezel Label – English, Dutch, Polish, and Japanese	Masimo SpO ₂	21501-001171
158	1	3006241-096	Parameter Bezel Label – German, Swedish, Danish, Norwegian, and Finnish	Masimo SpO ₂	21501-001173
158	1	3006241-095	Parameter Bezel Label – French	Masimo SpO ₂	21501-001172
158	1	3006241-097	Parameter Bezel Label – Spanish, and Portuguese	Masimo SpO ₂	21501-001174
158	1	3006241-098	Parameter Bezel Label – Italian	Nellcor SpO ₂	21501-001175

Parameter Bezel Label Language *(continued)*

158

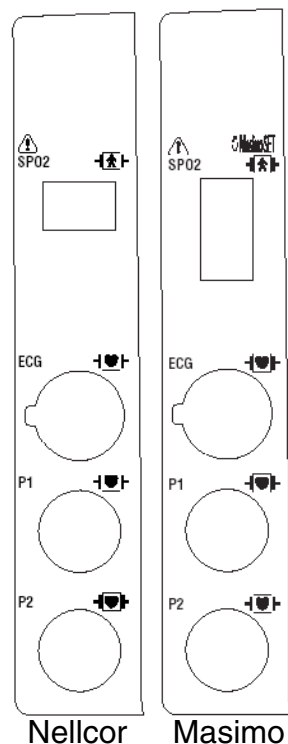


With IP

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

Parameter Bezel Label Language *(continued)*

158

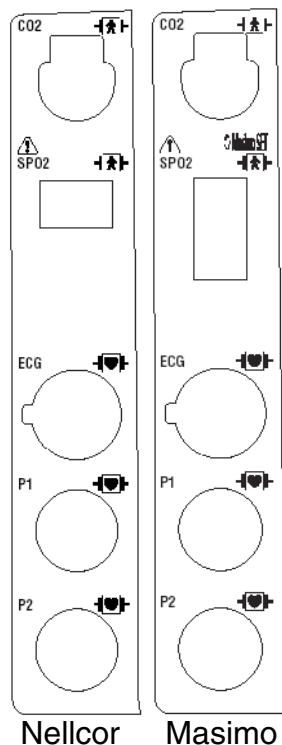


With SpO2
and IP

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

Parameter Bezel Label Language *(continued)*

158

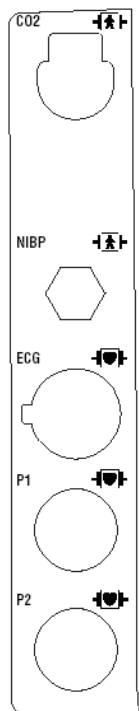


With SpO2,
CO2, and IP

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

Parameter Bezel Label Language *(continued)*

158

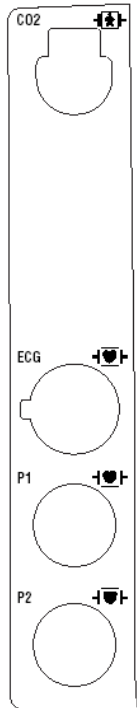


With NIBP,
CO2, and IP

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

Parameter Bezel Label Language *(continued)*

158

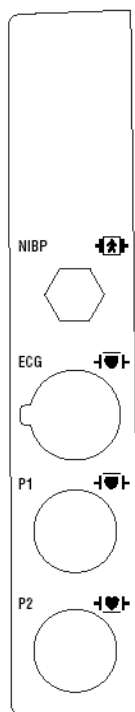


With CO2
and IP

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

Parameter Bezel Label Language *(continued)*

158



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	3006241-126	Parameter Bezel Label – French	NIBP moved for Masimo SpO2	21501-001207
158	1	3006241-127	Parameter Bezel Label – German, Swedish, Danish, Norwegian, and Finnish	NIBP moved for Masimo SpO2	21501-001208
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

Product Identification Label Language—Monophasic Devices

162



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



Item	Qty	MIN	Part Description	CAT.
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

164

DANGER EXPLOSION HAZARD. DO NOT USE IN THE PRESENCE OF FLAMMABLE GASES.
WARNING HAZARDOUS ELECTRICAL OUTPUT. FOR USE ONLY BY QUALIFIED PERSONNEL.

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

170

MANUAL DEFIBRILLATION

1 Push ON. Apply conductive gel to hard paddles or apply combination electrodes.

2 Select ENERGY.

3 Push CHARGE. Stand clear.

Push SHOCK to delivery energy.

AED OPERATION

• Push ON.

• Push ANALYZE.

• Push SHOCK when directed to deliver energy.

No Pacer,
with AED

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

Operating Instruction Label Language *(continued)*

170

MANUAL DEFIBRILLATION

1 Push ON. Apply conductive gel to hard paddles or apply combination electrodes.

2 Select ENERGY.

3 Push CHARGE. Stand clear.

Push SHOCK to delivery energy.

AED OPERATION

• Push ON.

• Push ANALYZE.

• Push SHOCK when directed to deliver energy.

PACER OPERATION

• Push PACER to turn pacer on.

• Push RATE button and adjust up or down as needed.

• Push CURRENT button and adjust to capture.

With Pacer and
AED

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

Operating Instruction Label Language *(continued)*

170

MANUAL DEFIBRILLATION

- 1 Push ON. Apply conductive gel to hard paddles or apply combination electrodes.
- 2 Select ENERGY.
- 3 Push CHARGE. Stand clear.
Push SHOCK to delivery energy.

No Pacer,
no AED

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)*

170

MANUAL DEFIBRILLATION

1 Push ON. Apply conductive gel to hand paddles or apply combination electrodes.

2 Select ENERGY.

3 Push CHARGE. Stand clear.

Push SHOCK to delivery energy.

PACER OPERATION

- Push PACER to turn pacer on.

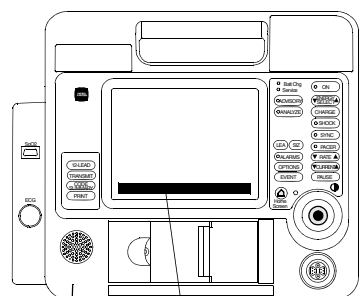
- Push RATE button and adjust up or down as needed.

- Push CURRENT button and adjust to capture.

With Pacer,
no AED

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



Messages

Voice



Reference item
(not a catalog item)

Qty	MIN	Dash*	Dash**	Dash***	Part Description
1	3011371	-051	-074	-200	Font/Voice System Software – English
1	3011371	-052	-075	-201	Font/Voice System Software – French
1	3011371	-053	-076	-202	Font/Voice System Software – German
1	3011371	-054	-077	-203	Font/Voice System Software – Spanish
1	3011371	-055	-078	-204	Font/Voice System Software – Italian
1	3011371	-056	-079	-205	Font/Voice System Software – Swedish
1	3011371	-057	-080	-206	Font/Voice System Software – Danish
1	3011371	-049	-081	-207	Font/Voice System Software – Portuguese
1	3011371	-058	-082	-208	Font/Voice System Software – Norwegian
1	3011371	-059	-083	-209	Font/Voice System Software – Dutch
1	3011371	-060	-084	-210	Font/Voice System Software – Polish
1	3011371	-050	-085	-211	Font/Voice System Software – Finnish
1	3011371	-047	-086	-----	Font/Voice System Software – Korean
1	3011371	-----	-087	-213	Font/Voice System Software – Japanese
1	3011371	-----	-105	-214	Font/Voice System Software – Mandarin Chinese

* For Operating Software 3011371-018 to -070

** For Operating Software 3011371-072 to -124

*** For Operating Software 3011371-130 or later

A12 Printer (50 mm) Parts List

Item	Qty	MIN	Description	CAT.
A12	1	804189-02	50-mm Printer [see 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	3006229-005	100-mm Printer	21300-007018
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 List – 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
815	1	3009762-00	PCB Assy	21330-000953
816	1	202187-001	Retainer Knob	21300-000956

Standard Paddle Parts List – Apex and Sternum *(continued)*

Item	Qty	MIN	Part Description	CAT.
817	2	802935-	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	
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	

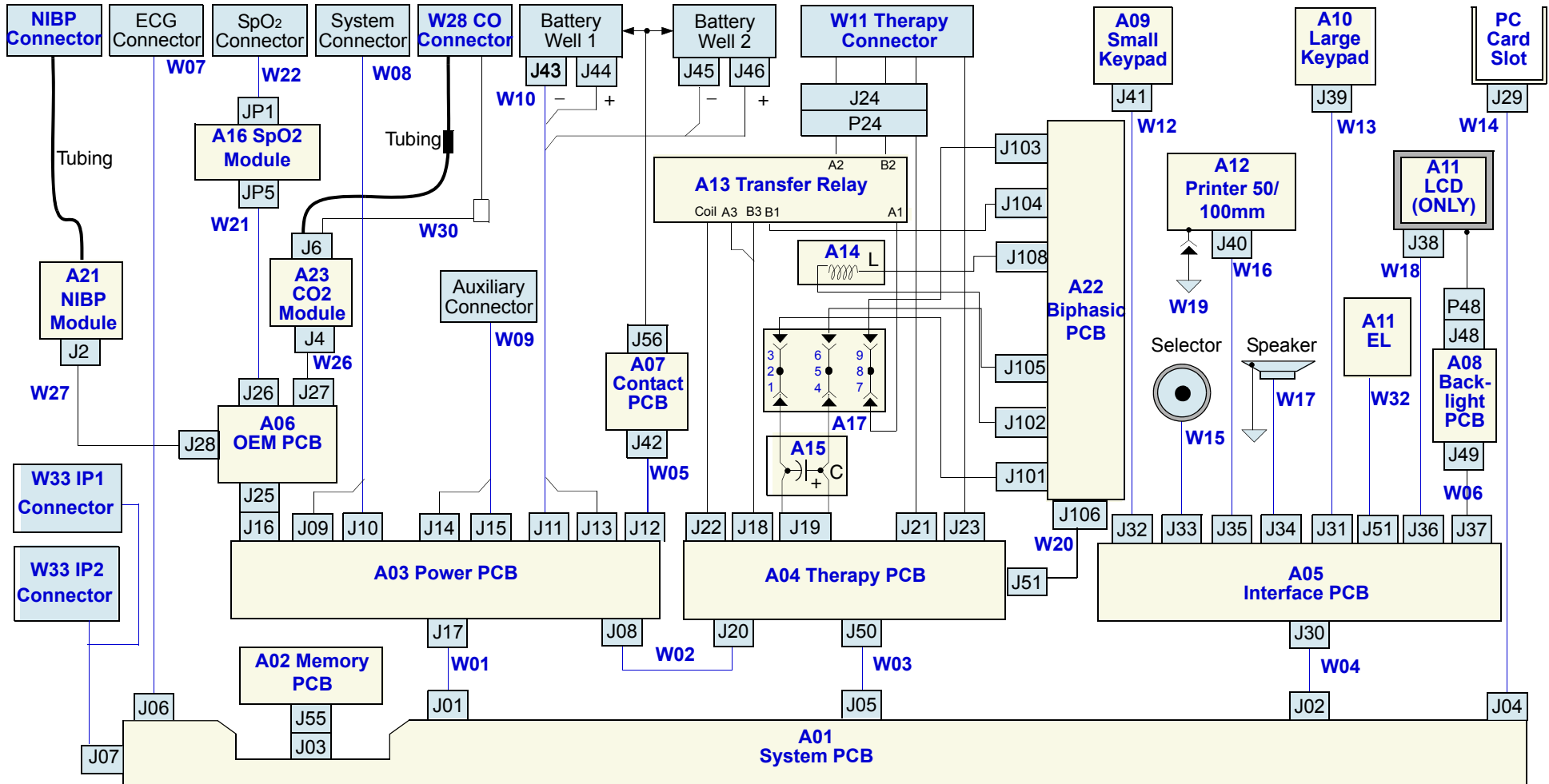
Standard Paddle Parts List – Apex and Sternum *(continued)*

Item	Qty	MIN	Part Description	CAT.
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	
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	

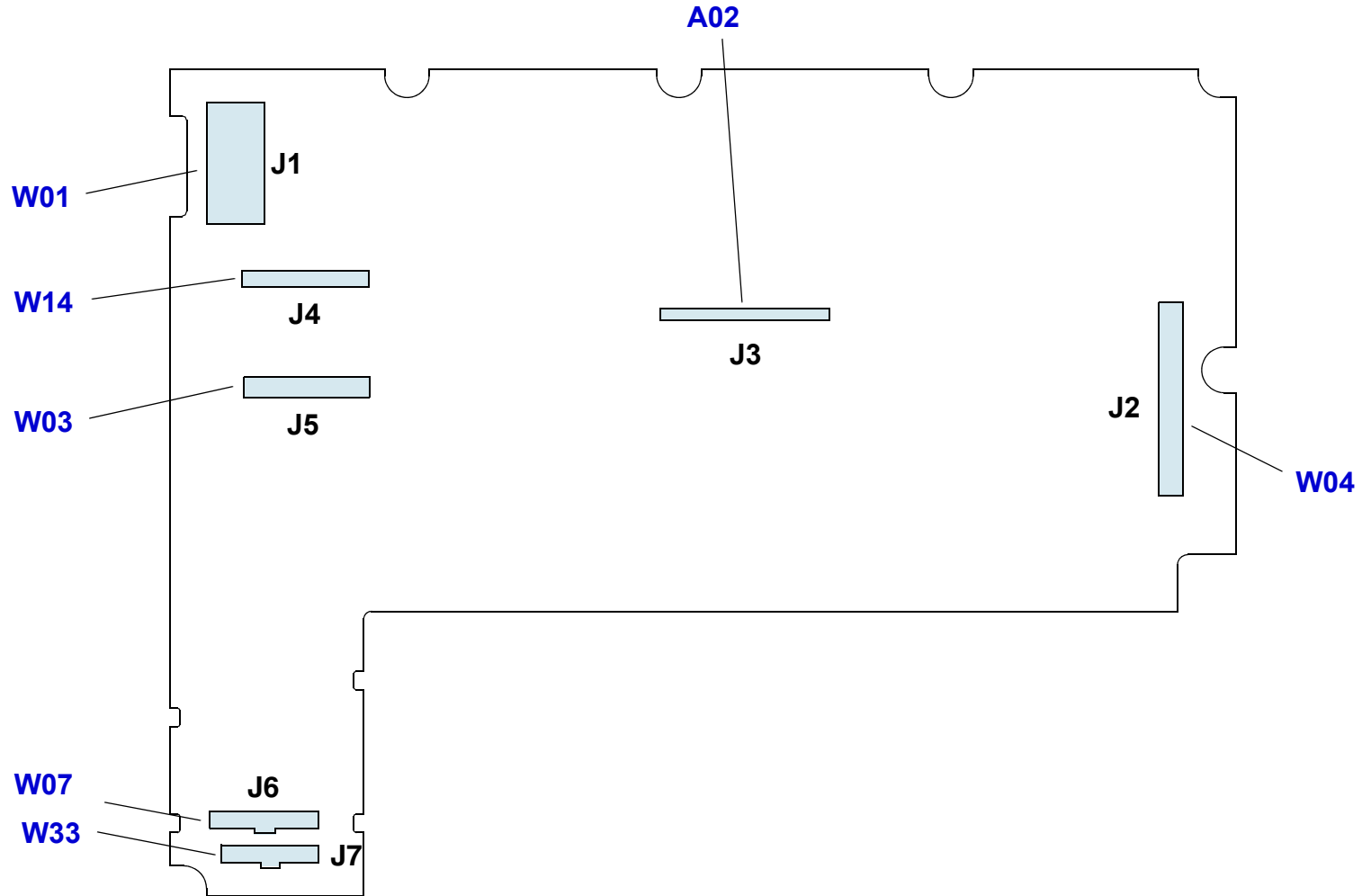
Standard Paddle Parts List – Apex and Sternum *(continued)*

Item	Qty	MIN	Part Description	CAT.
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

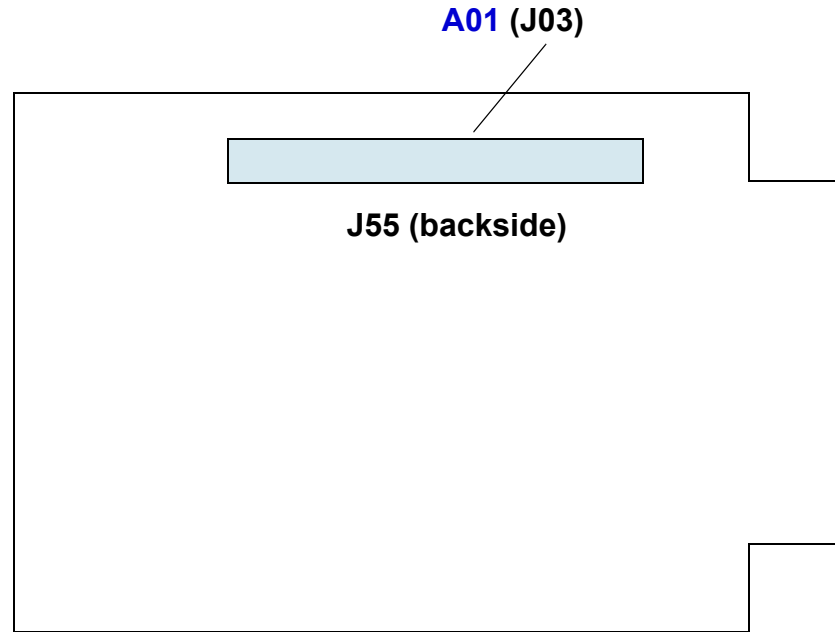
Biphasic Interconnect Diagram



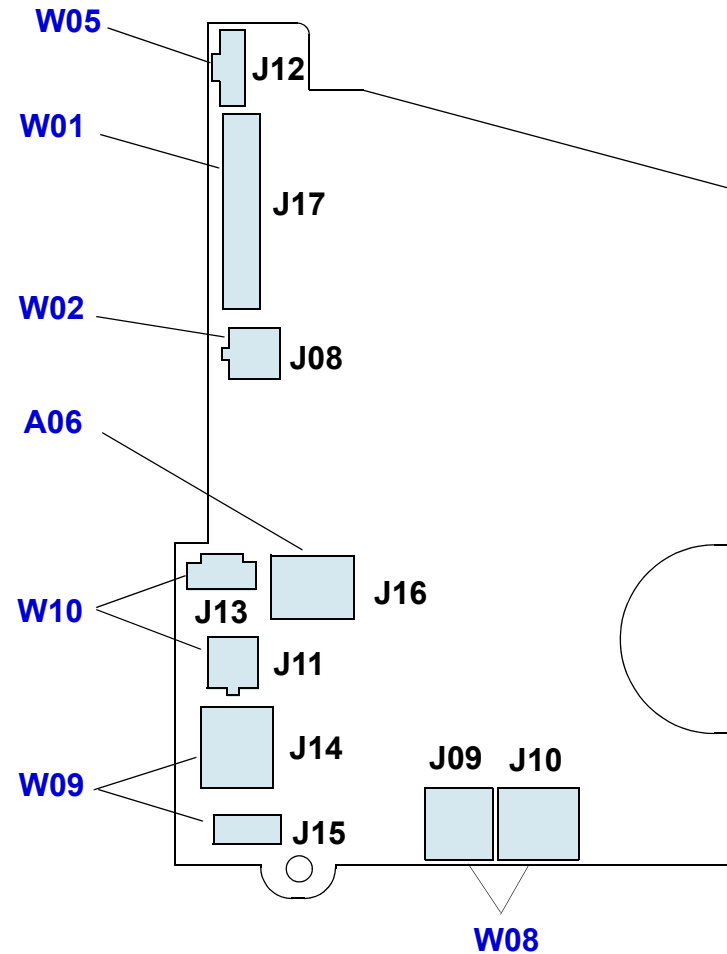
A01 System PCB (Part of System/Memory) — MIN **3006227**



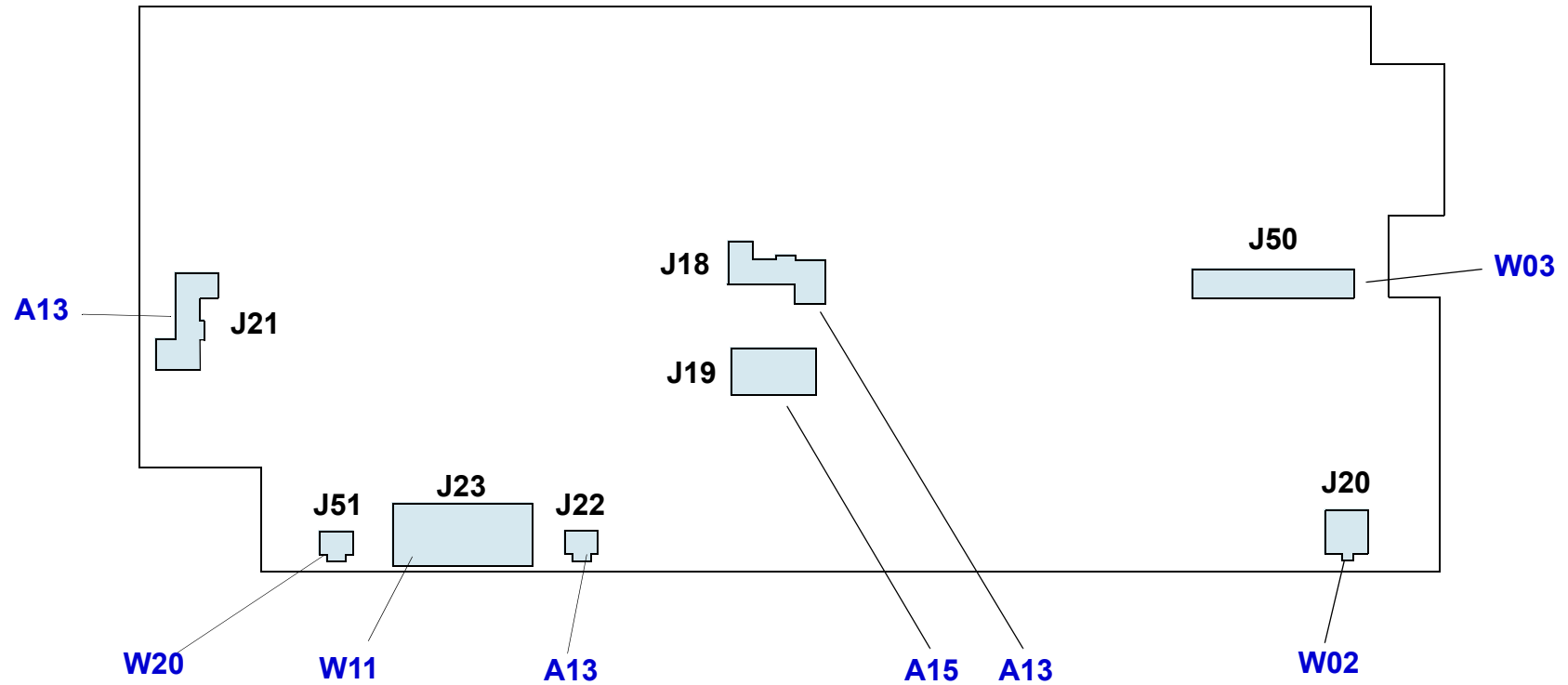
A02 Memory PCB — MIN **3008520**



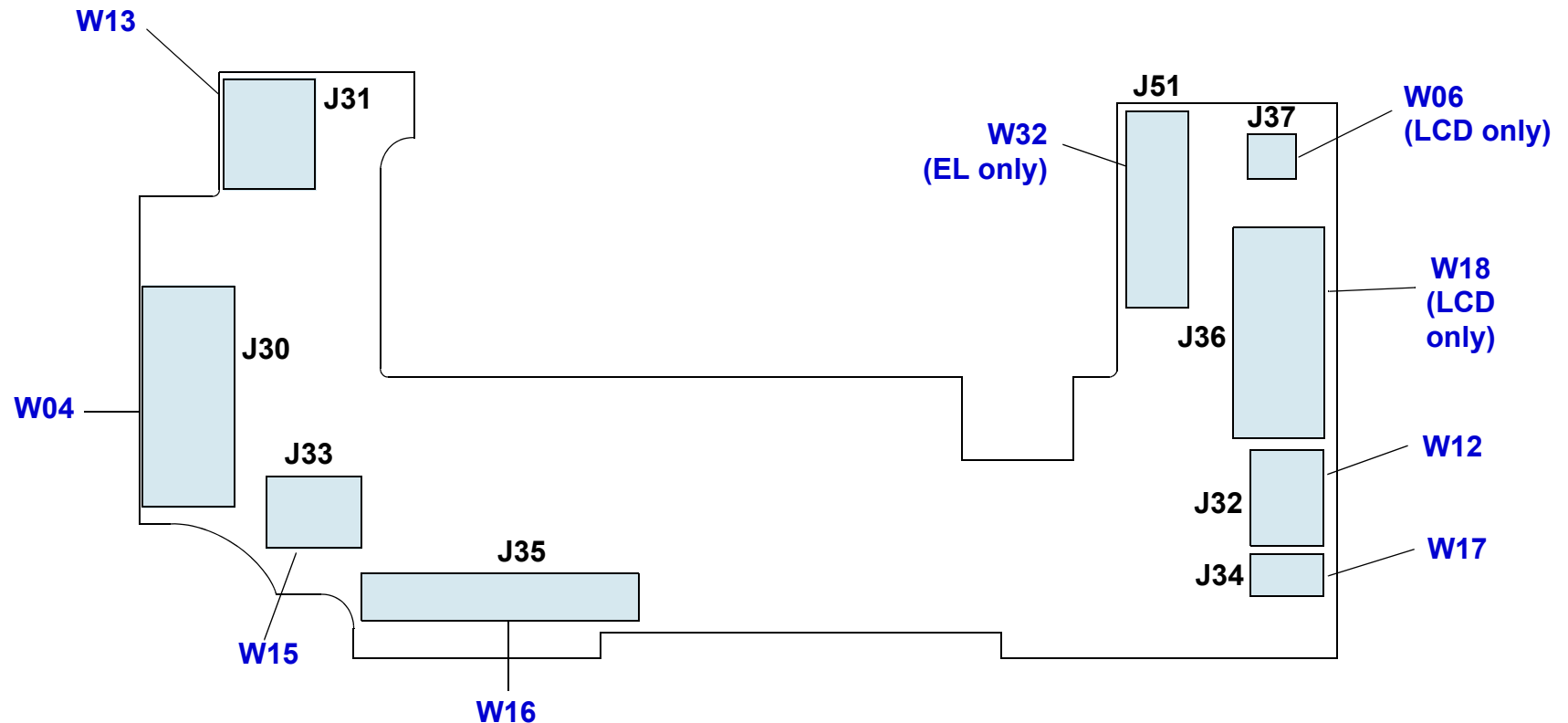
A03 Power PCB — MIN **3006237**



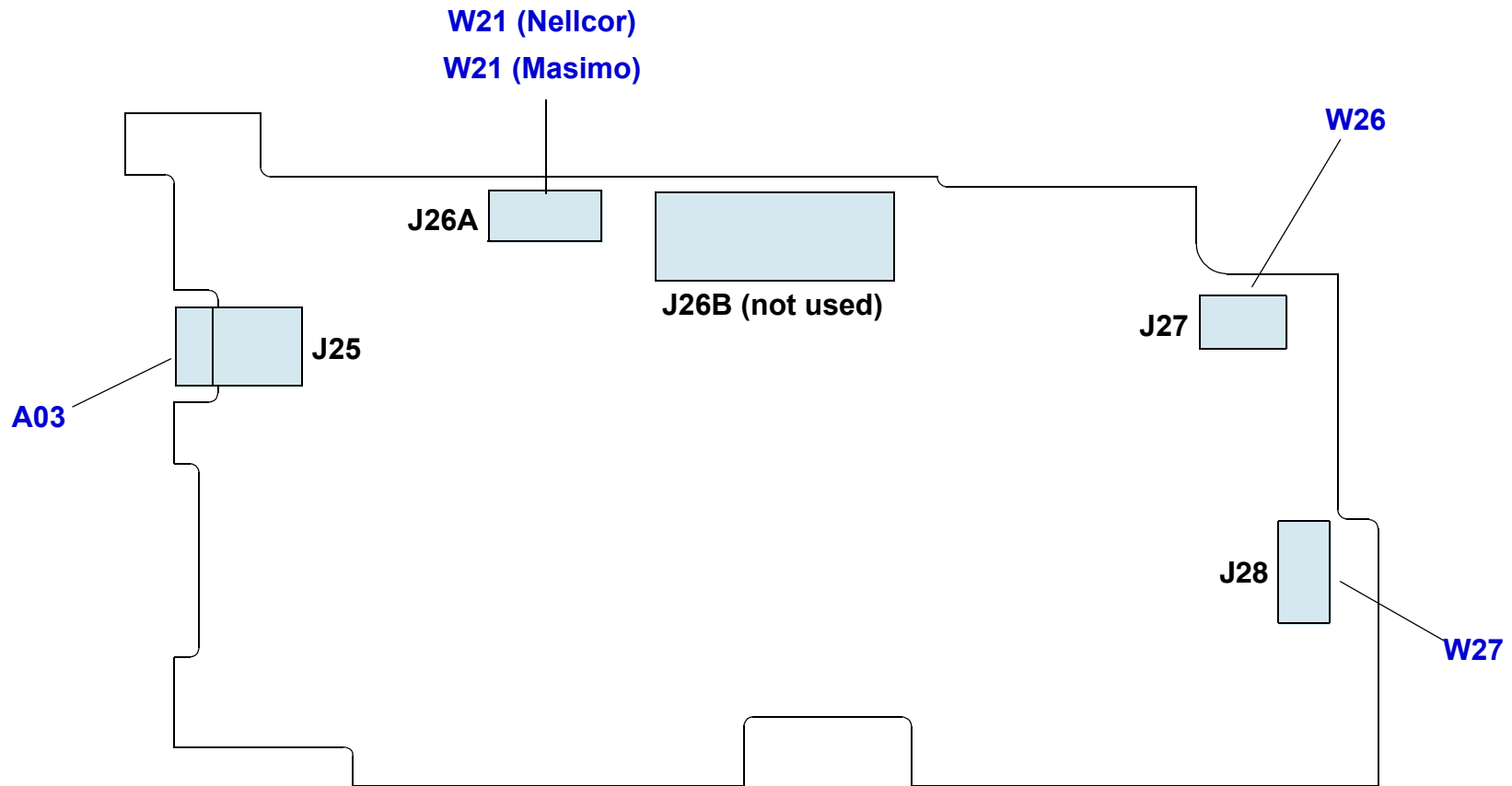
A04 Therapy PCB — MIN **3006235**



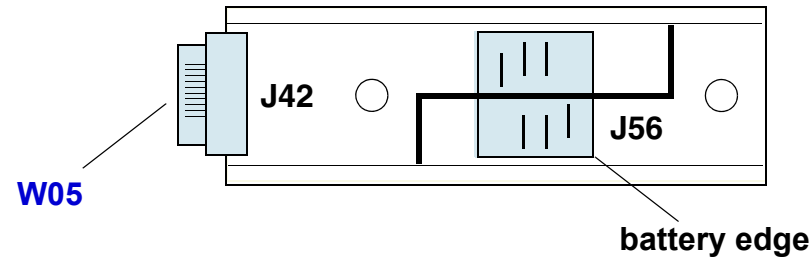
A05 Interface PCB — MIN 3010524



A06 OEM PCB Module — MIN **3008541**



A07 Contact PCB Module — MIN **3006394**

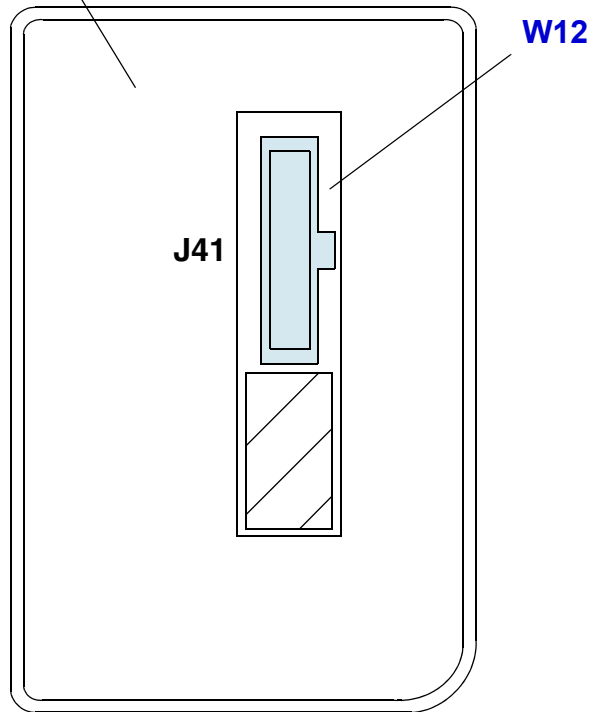


A08 Backlight PCB (LCD Only) — MIN **3006806**

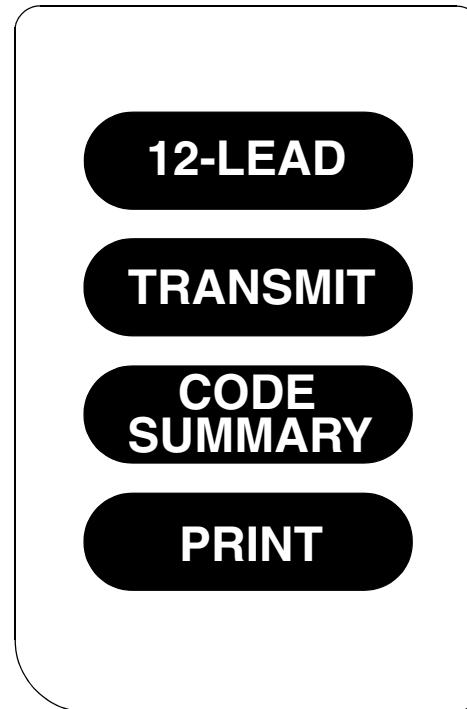


A09 Small Keypad — Various MINs

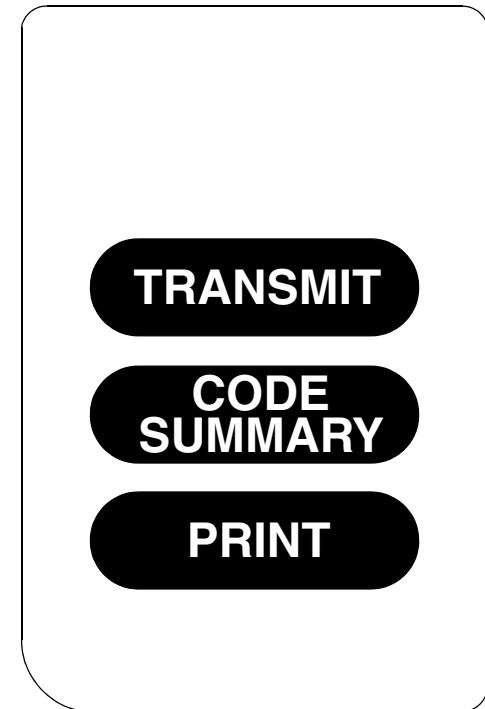
adhesive



rear view

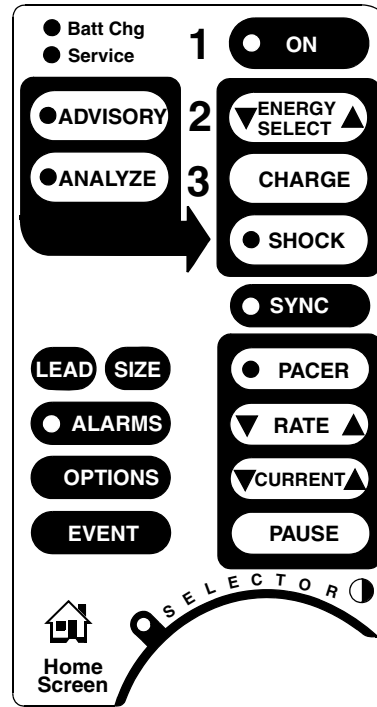
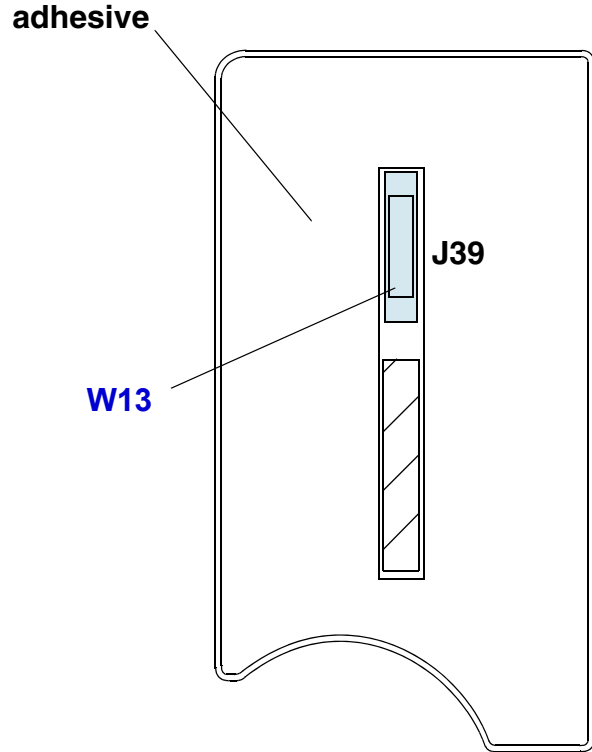


12-lead configuration

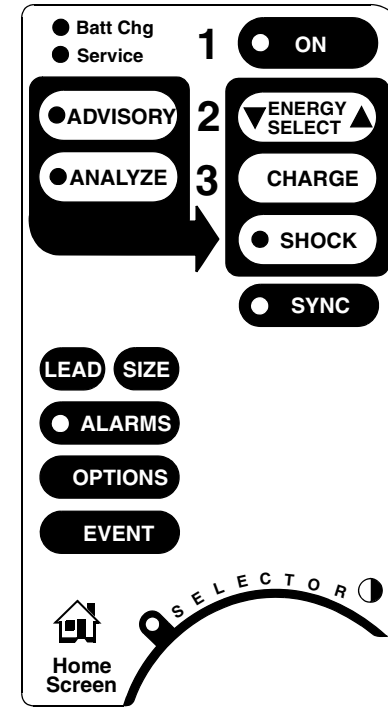


3-lead configuration
(standard)

A10 Large Keypad — Various MINs

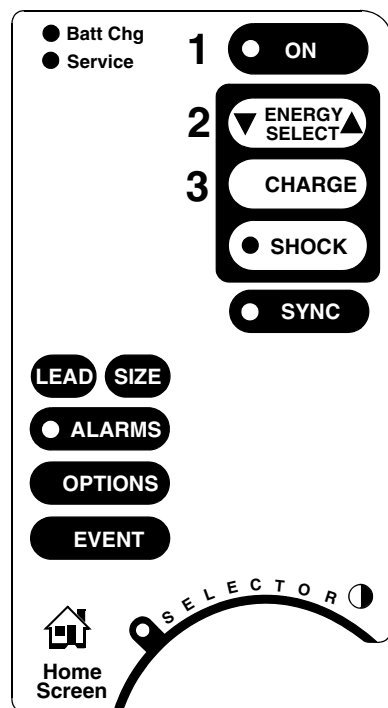


with PACER,
no NIBP,
with AED

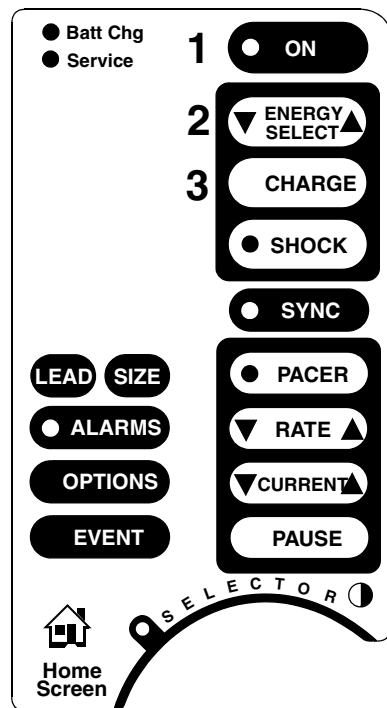


no PACER,
no NIBP,
with AED

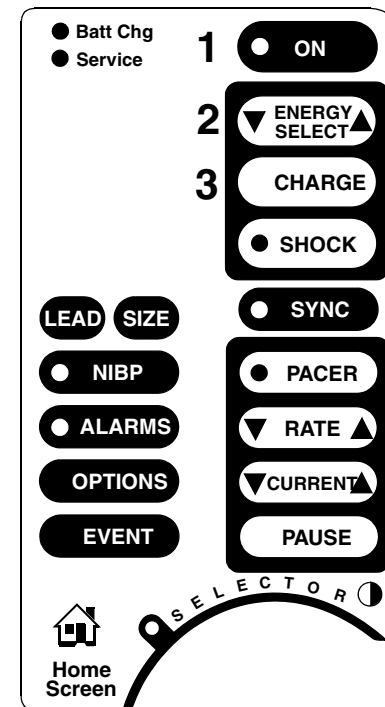
A10 Large Keypad (continued)



no PACER,
no NIBP,
no AED



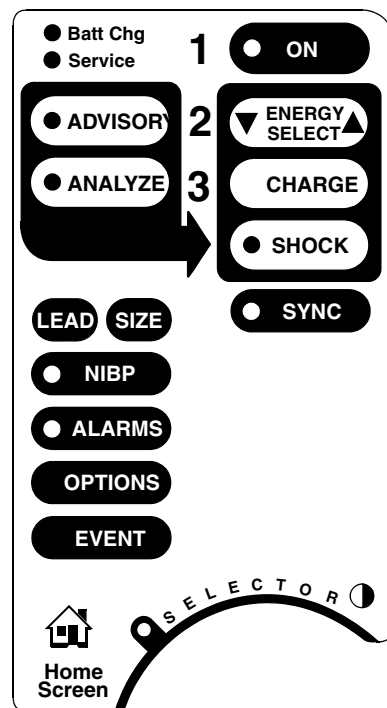
with PACER,
no NIBP,
no AED



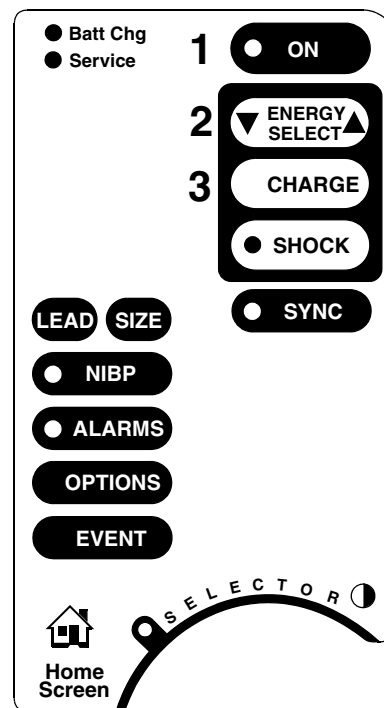
with PACER,
with NIBP,
no AED

(Continued on next page)

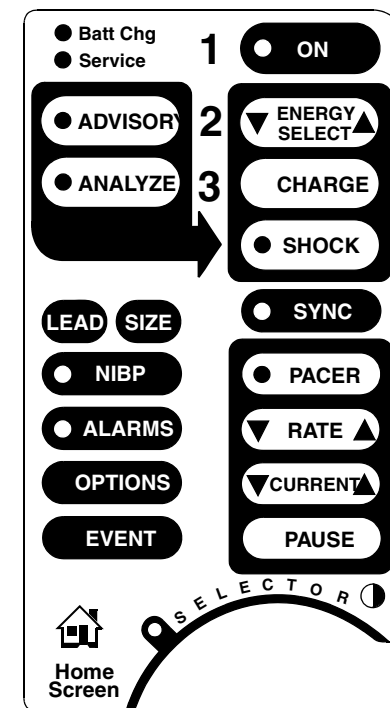
A10 Large Keypad (continued)



no PACER,
with NIBP,
with AED

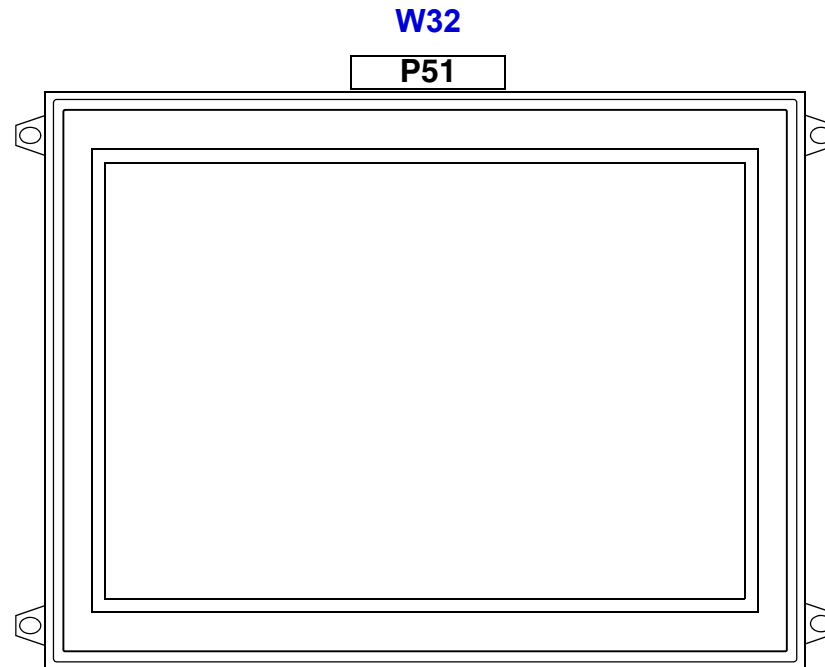


no PACER,
with NIBP,
no AED

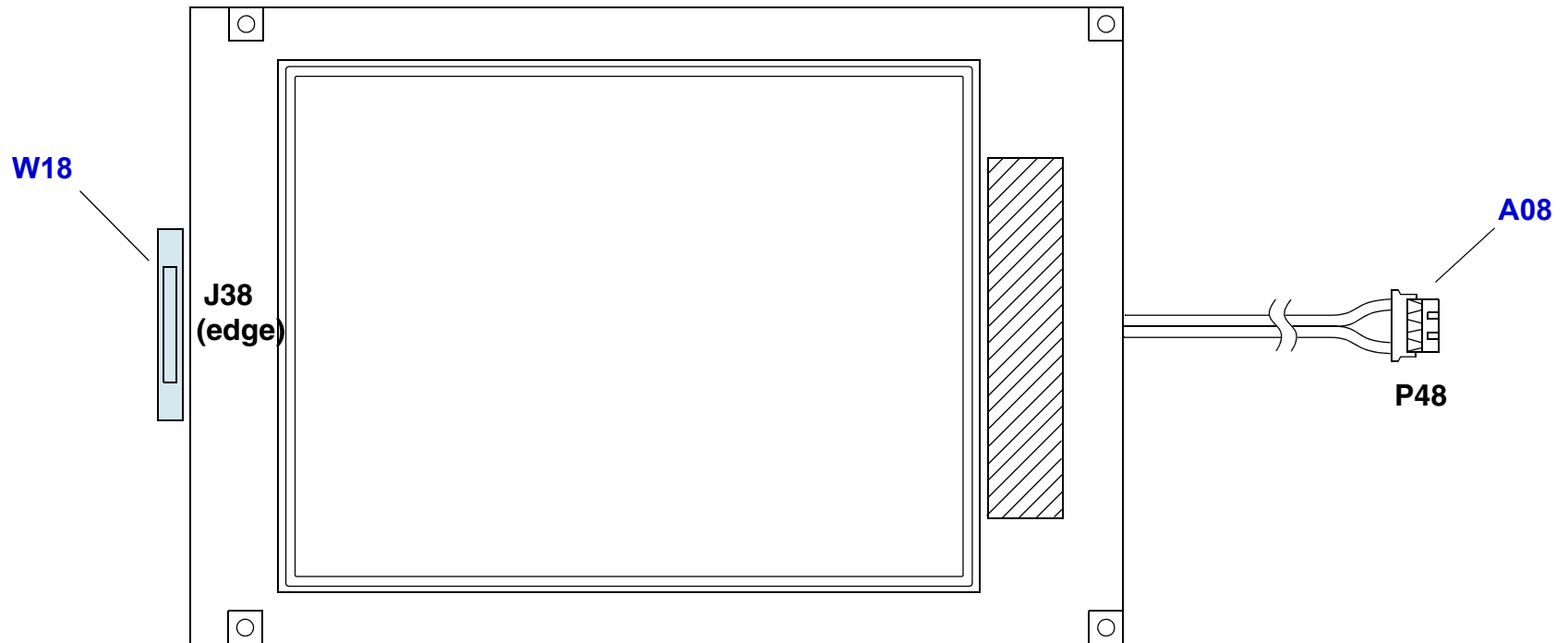


with PACER,
with NIBP,
with AED

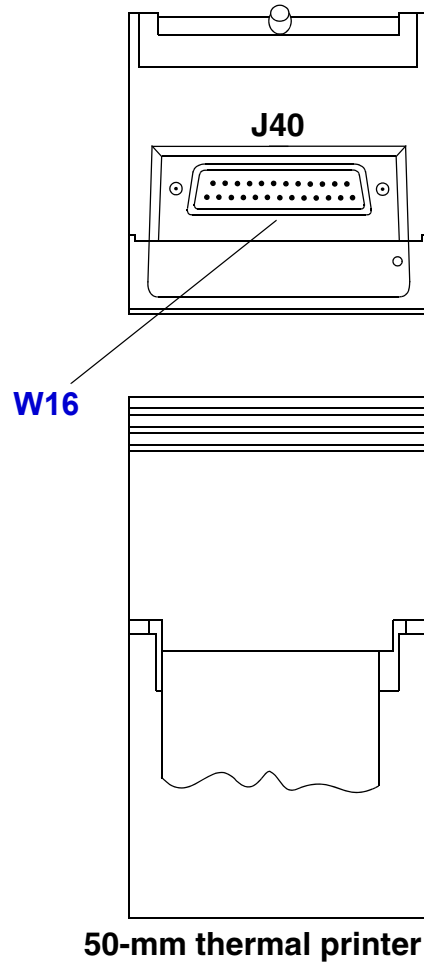
A11 EL Display Assembly — MIN 3012695



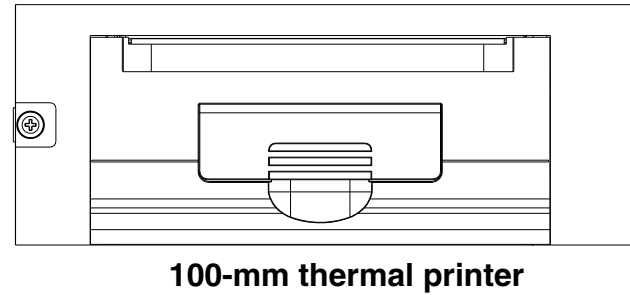
A11 LCD Assembly — MIN 3010612



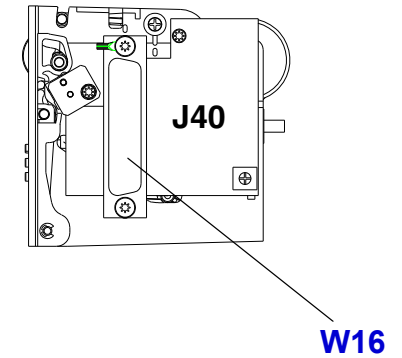
A12 Printer Assembly — Various MINs



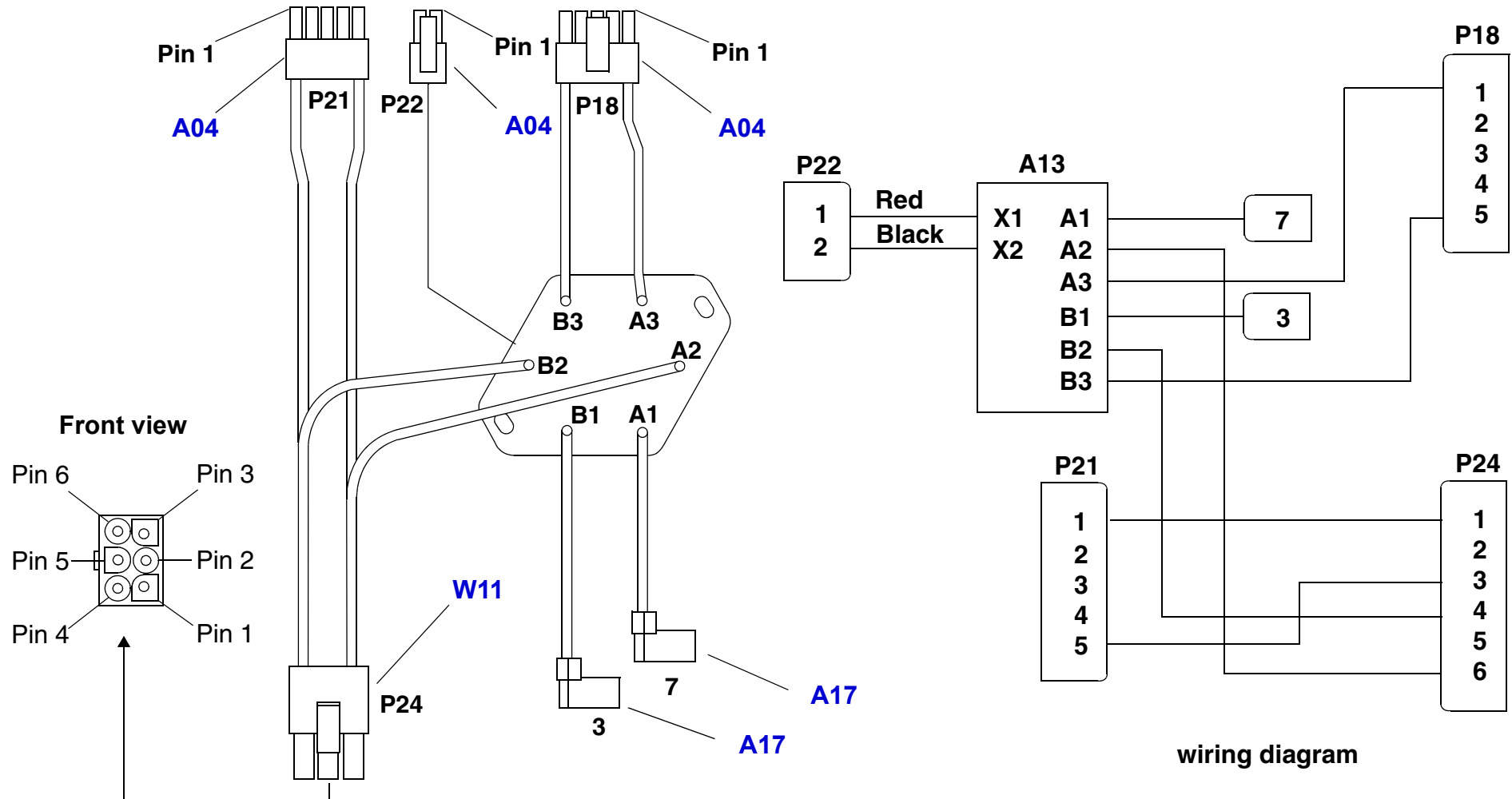
view 50-mm
printer parts



view 100-mm
printer parts

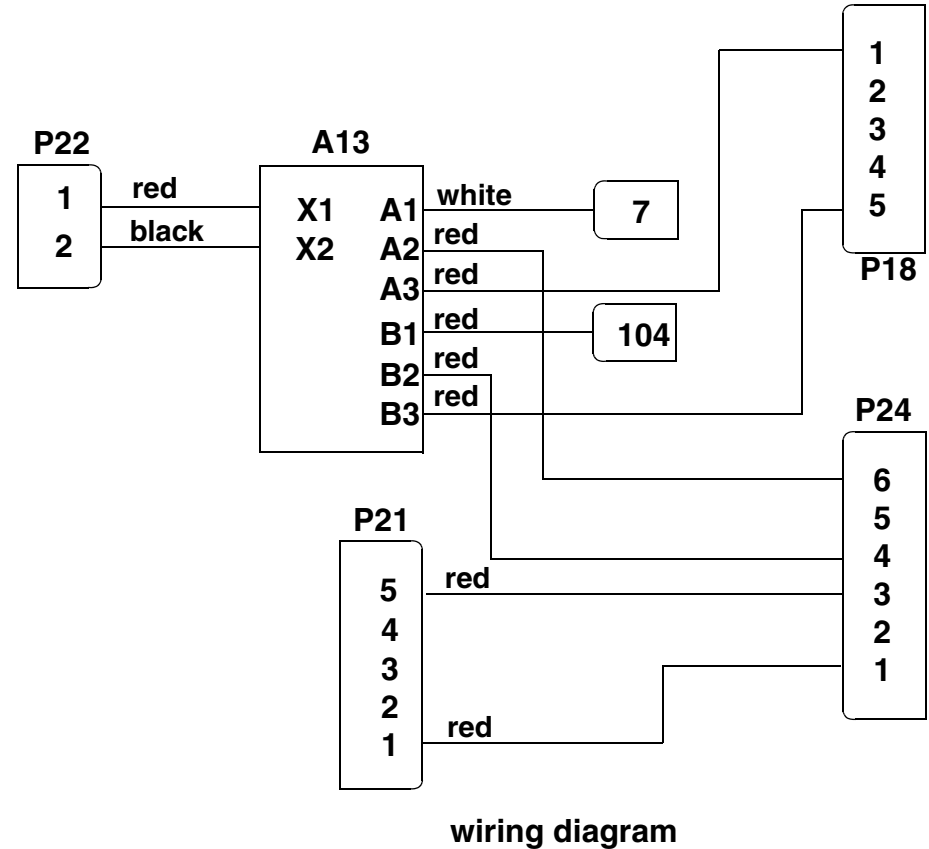
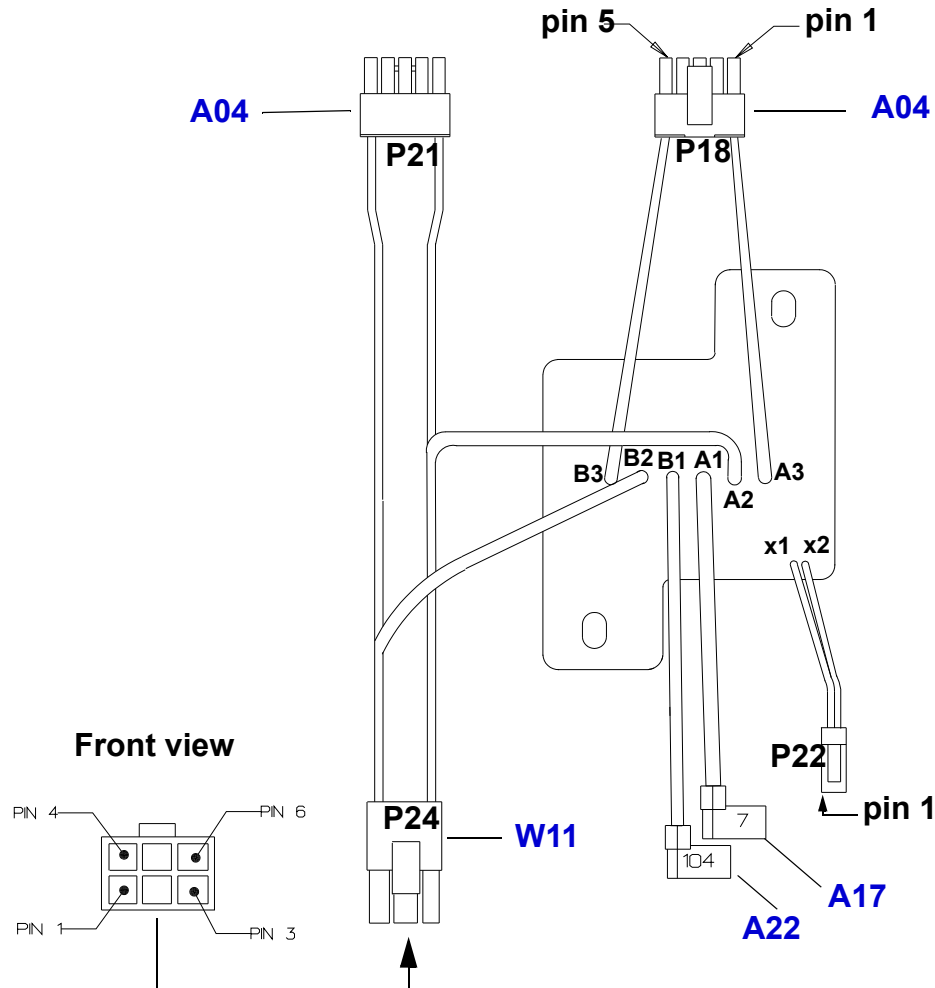


A13 Transfer Relay Assembly, Monophasic Devices — MIN 3006219

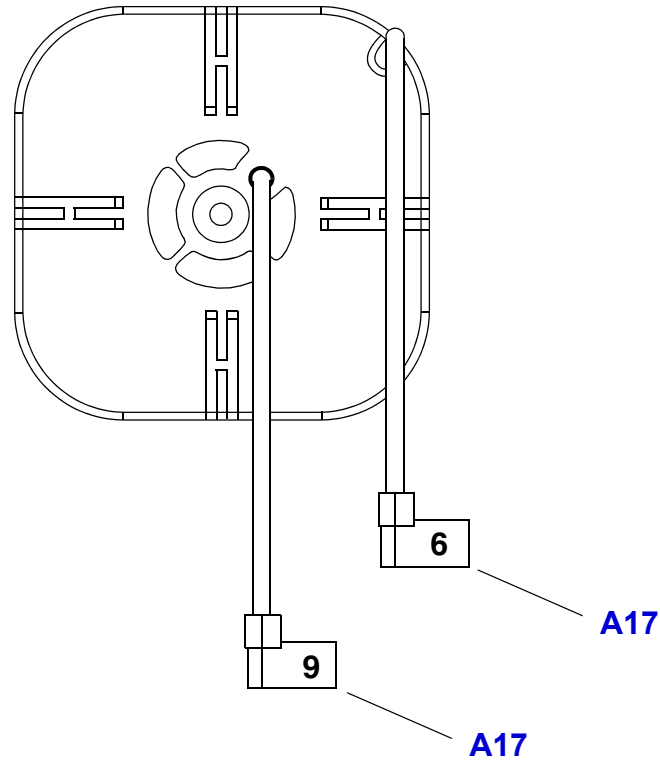


wiring diagram

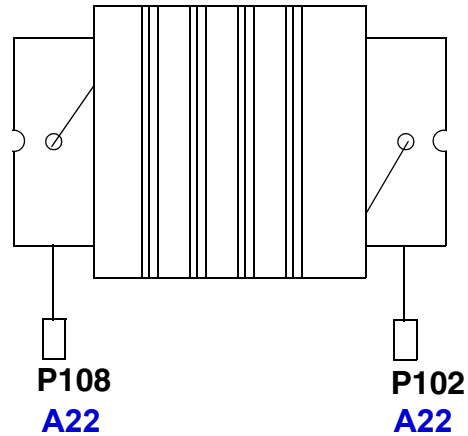
A13 Transfer Relay Assembly, Biphasic Devices — MIN 3201583



A14 Waveshaping Inductor, Monophasic Devices — MIN **3006221**



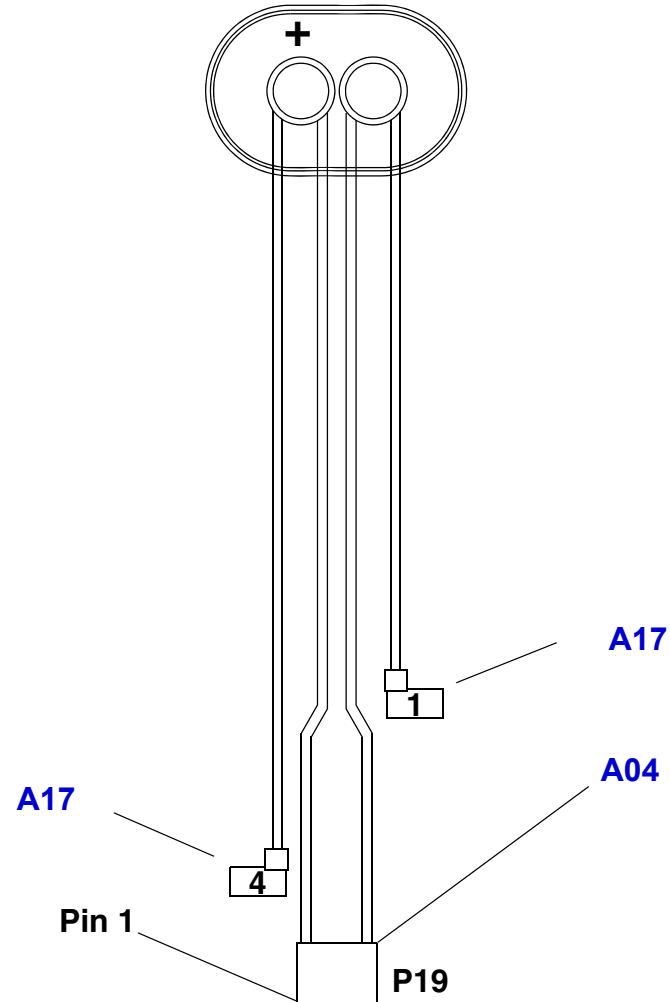
A14 Inductive Resistor, Biphasic Devices — MIN **3010212**



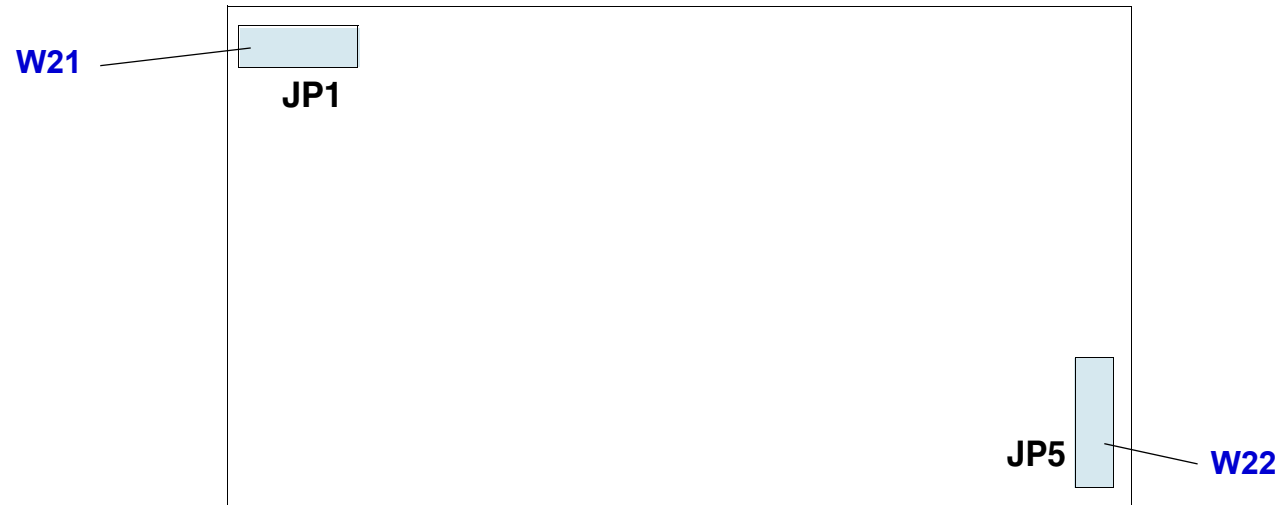
A15 Energy Storage Capacitor

Monophasic Devices - MIN 3006220

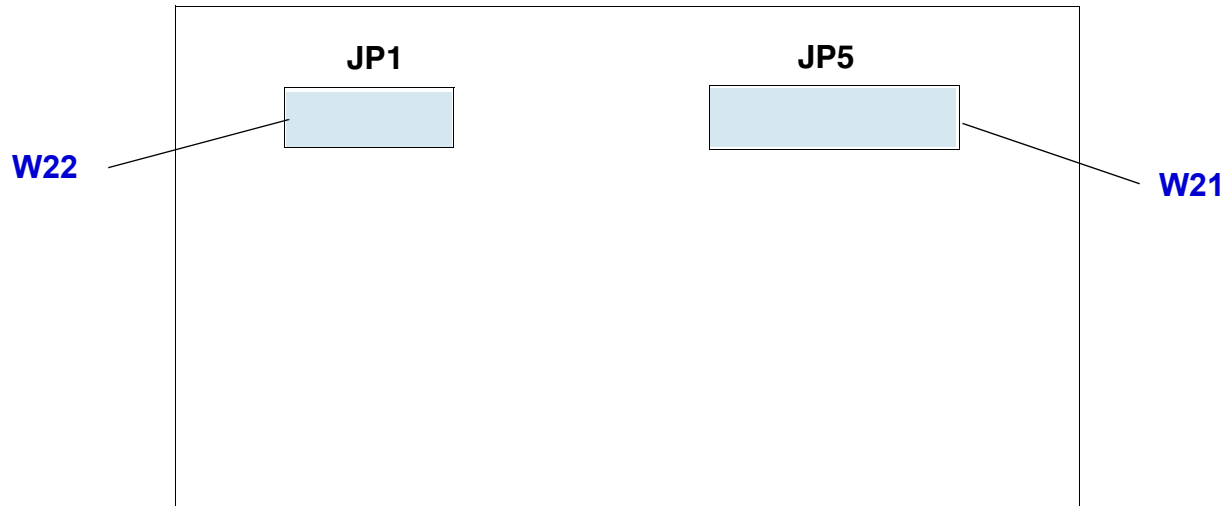
Biphasic Devices - MIN 3008164



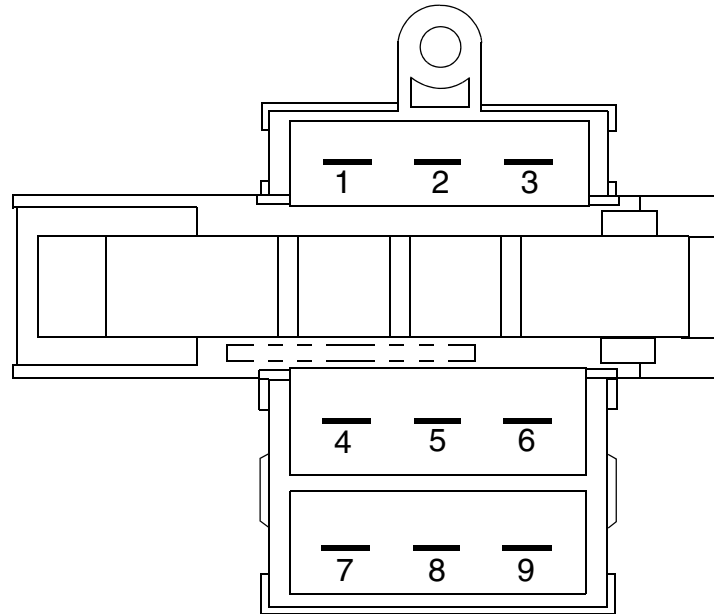
A16 SpO2 Module, Masimo — MIN **3203421**



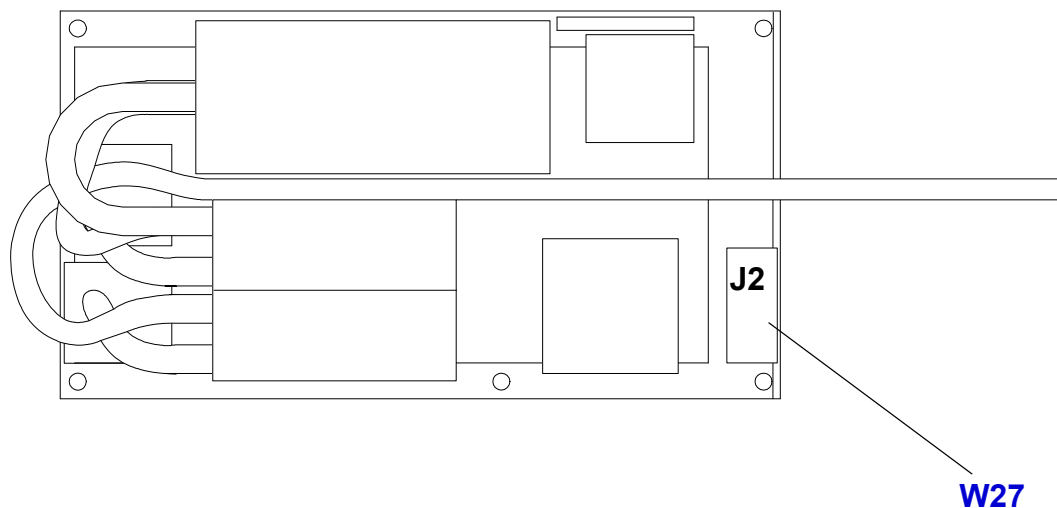
A16 SpO2 Module, Nellcor — MIN **3008538**



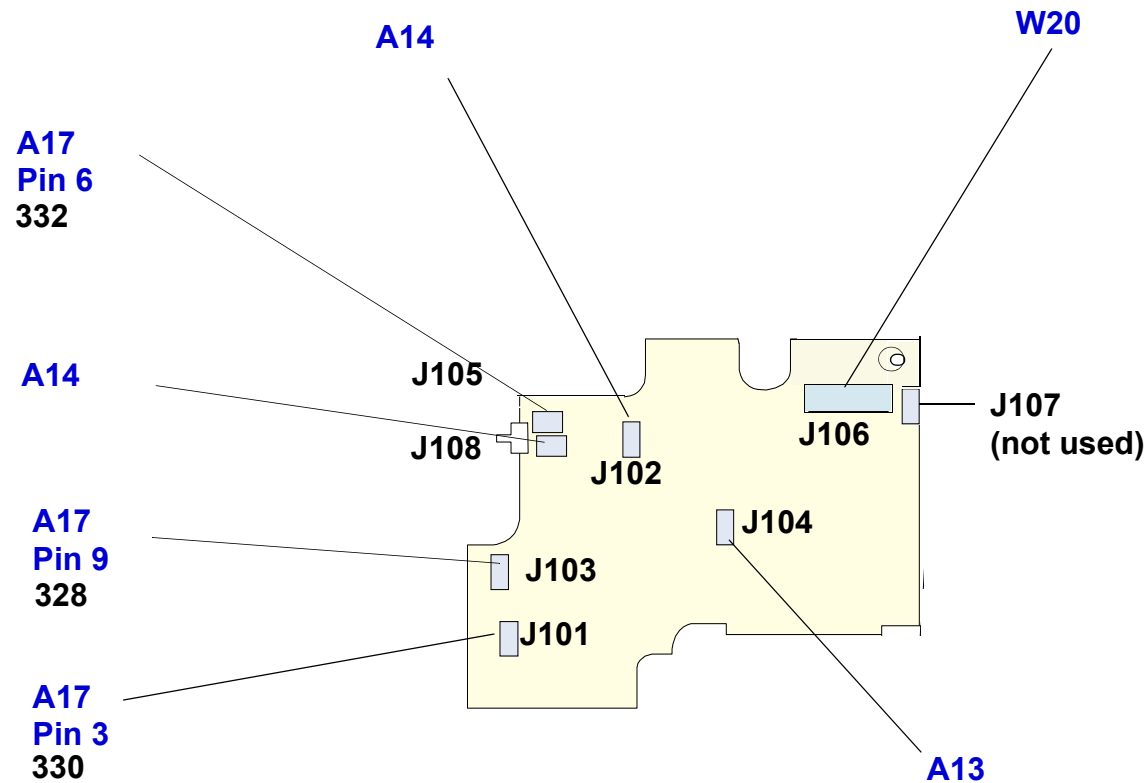
A17 Interconnect Bracket — MIN **3008897**



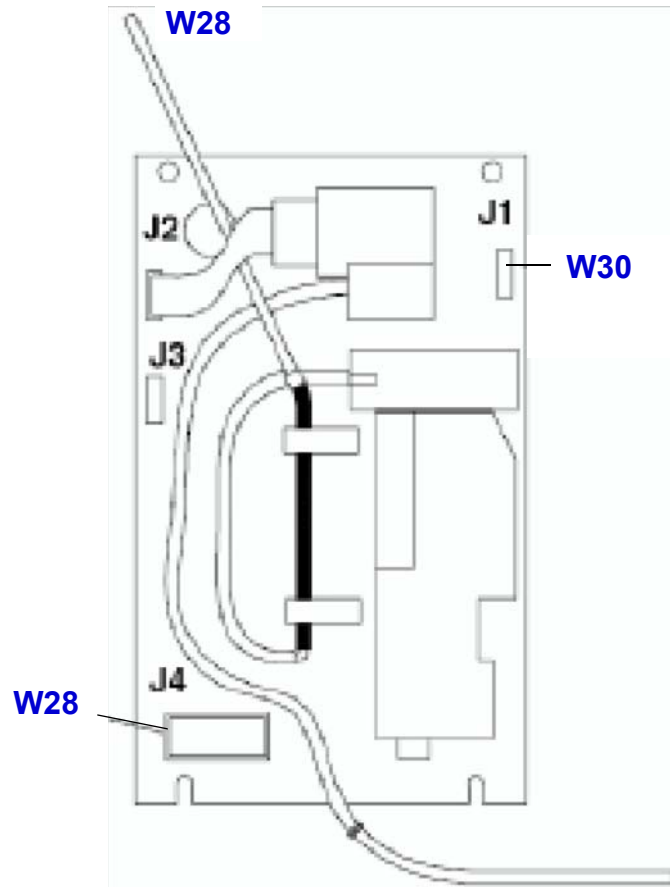
A21 NIBP Module — MIN **3008943**



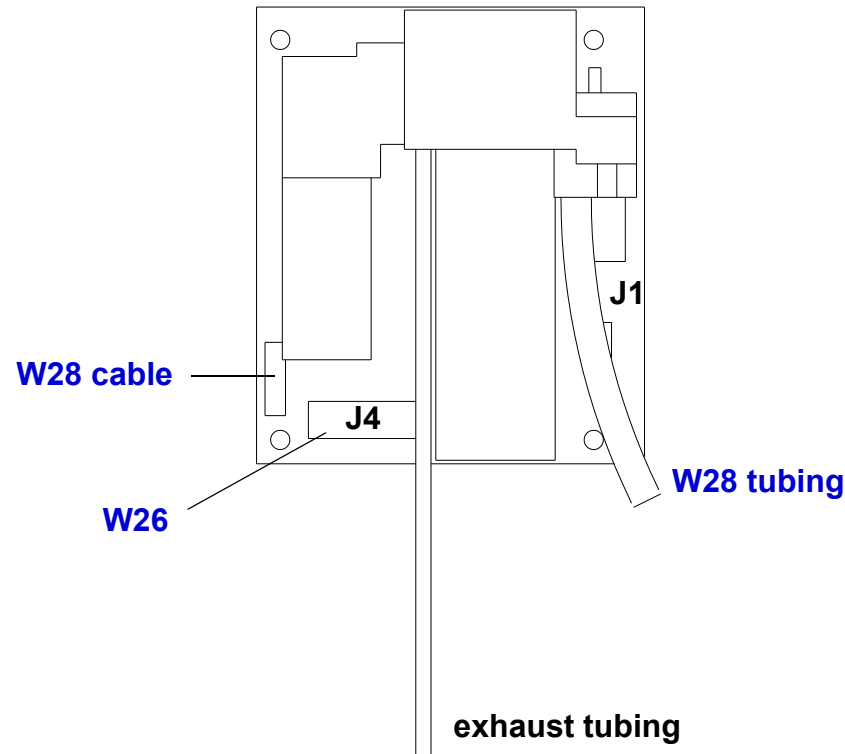
A22 Biphasic Module — MIN 3010178



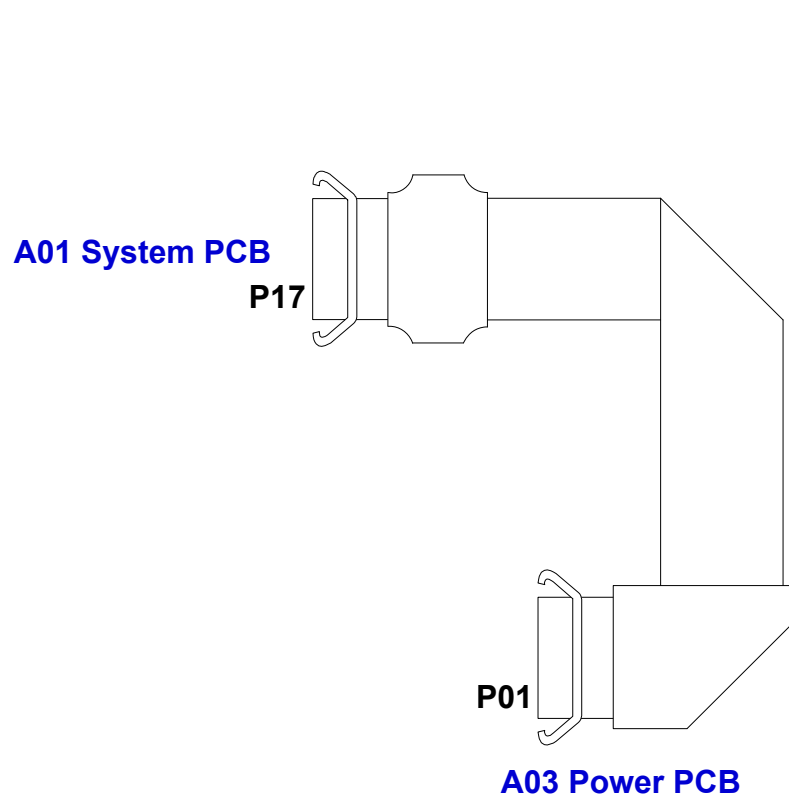
A23 CO2 Module — MIN **3012140**



A23 Mini-CO2 Module — MIN **3012140-006**

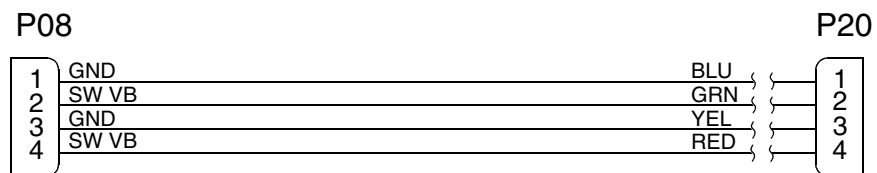
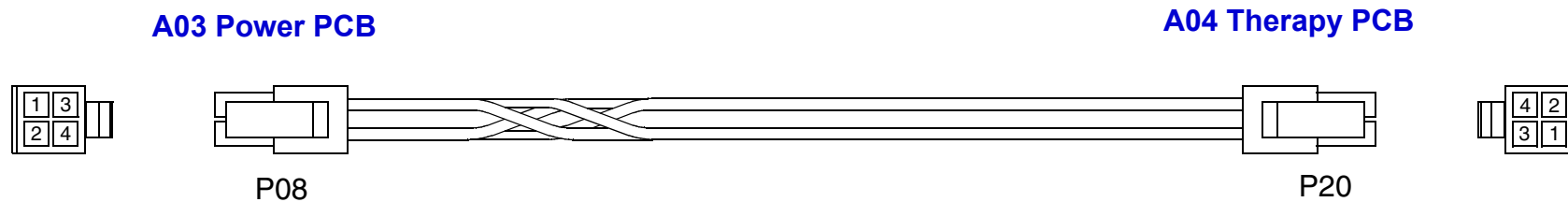


W01 Power PCB/System PCB Cable — MIN **3009677**



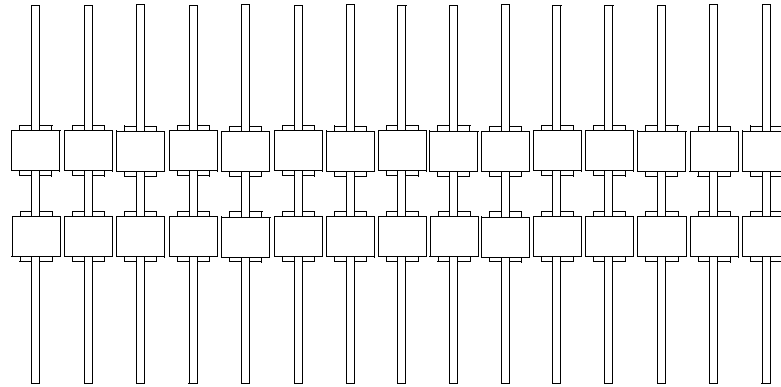
P1		P17
1	GND	1
2	PWR SW*	2
3	PWR MON	3
4	CHG LED	4
5	PWR LED	5
6	GND	6
7	PWR FAIL*	7
8	PWR TX	8
9	PWR RX	9
10	PS FAIL*	10
11	SYS TX	11
12	SYS RTS	12
13	SYS RX	13
14	SYS CTS	14
15	SYS DTR	15
16	ANALOG ECG	16
17	GND	17
18	NIBP TX	18
19	NIBP RX	19
20	SP TX	20
21	SP RX	21
22	SP ET SYNC	22
23		23
24	GND	24
25	OEM RES*	25
26	ET TX	26
27	ET RX	27
28	NIBP ON	28
29	OEM VPP ENA	29
30	GND	30
31		31
32		32
33		33
34		34

W02 Power PCB/Therapy PCB Cable — MIN **3009726**



W03 System PCB/Therapy PCB Connector — MIN **3009878**

A01 System PCB

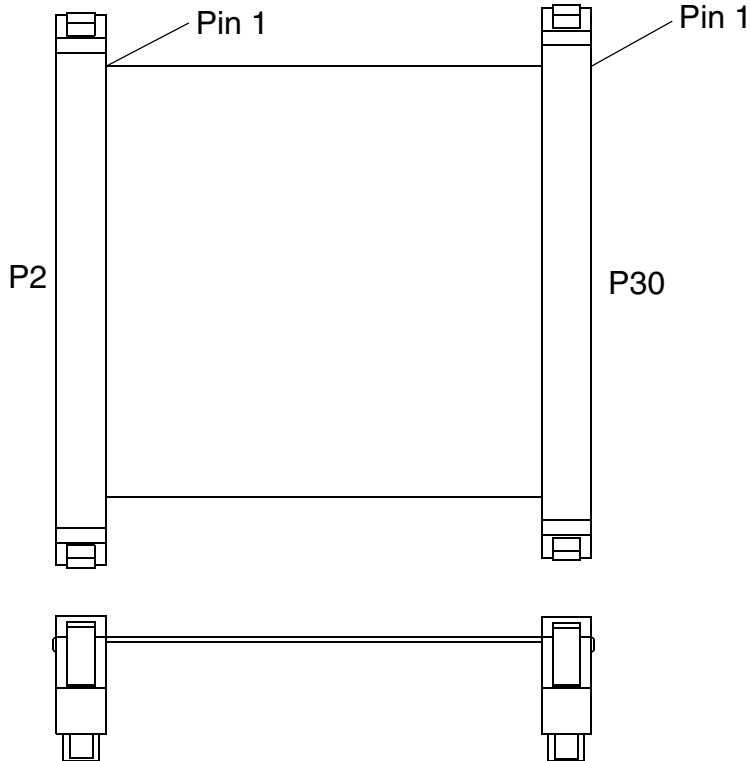


A04 Therapy PCB

W04 System PCB/Interface PCB Cable — MIN 3009677

A01 System PCB

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	15
17	PWR SW*	16
18	CHG LED	17
19	PWR LED	18
20	SW VB	19
21	GND	20
22	LCD BL ON	21
23	LCD FRM	22
24	LCD LE	23
25	GND	24
26	LCD CLK	25
27	LCD ON	26
28	LCD VL	27
29	GND	28
30	LCD VEE	29
31	LCD DH<0>	30
32	LCD DH<1>	31
33	LCD DH<2>	32
34	GND	33
35		34

P2		P30
35	LCD DH<3>	34
36	LCD DL<0>	35
37	LCD DL<1>	36
38	GND	37
39	LCD DL<2>	38
40	LCD DL<3>	39
41	LCD VCC	40
42	GND	41
43	MOTOR-	42
44	MOTOR+	43
45	THERM2	44
46	GND	45
47	VDD	46
48	DATA	47
49	STB1*	48
50	STB2*	49
51	LATCH	50
52	CLK	51
53	GND	52
54	VHD	53
55	VHD	54
56	VHD	55
57	VHD	56
58	GND	57
59	VHD	58
60	VHD	59
61	VHD	60
62	VHD	61
63	GND	62
64	HEAD TYPE	63
65	EMITTER CATHODE	64
66	SENSOR COLLECTOR	65
67	EMITTER ANODE	66
68	GND	67
		68

W05 Power PCB/Contact PCB Cable — MIN **3009678**

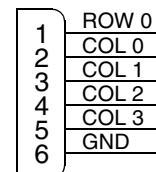
A03 Power PCB



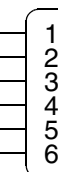
A07 Contact PCB



P12



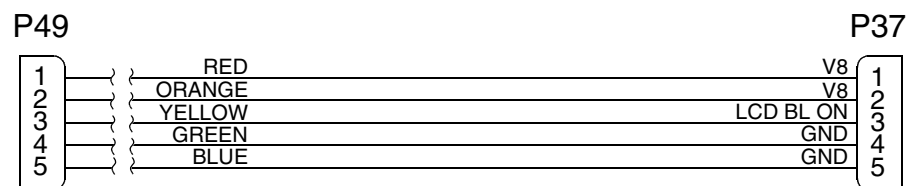
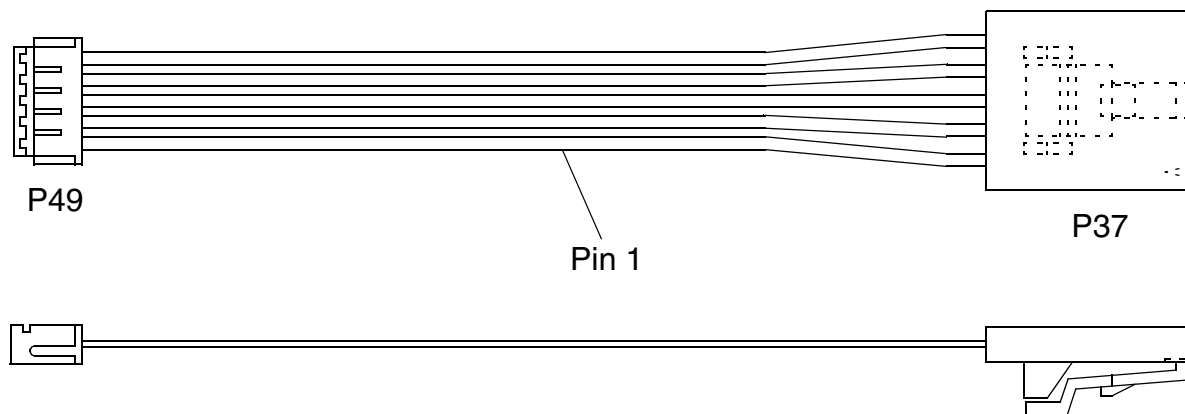
P42



W06 Backlight PCB/Interface PCB Cable (LCD Only) — MIN 3009702

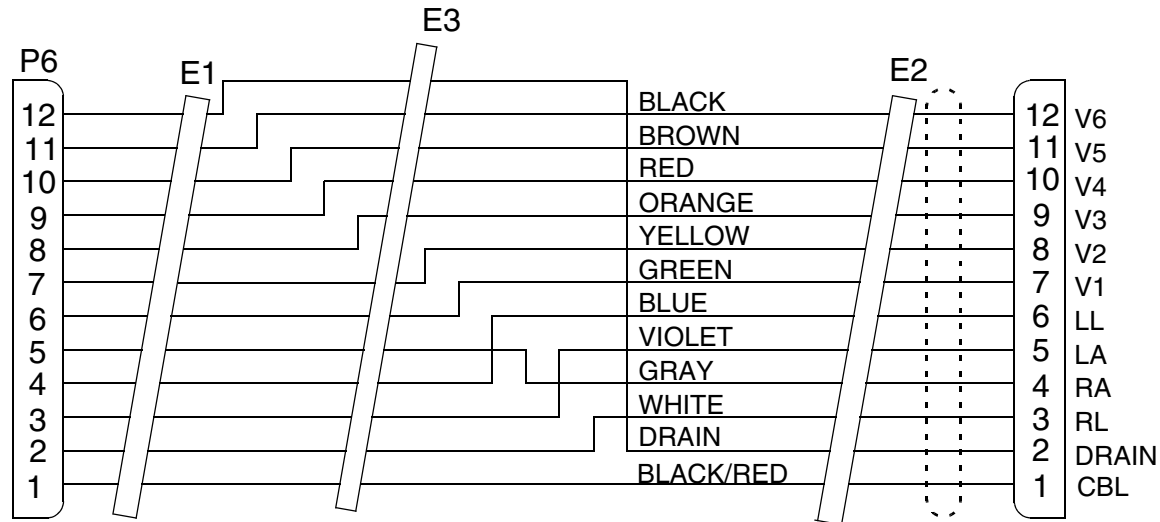
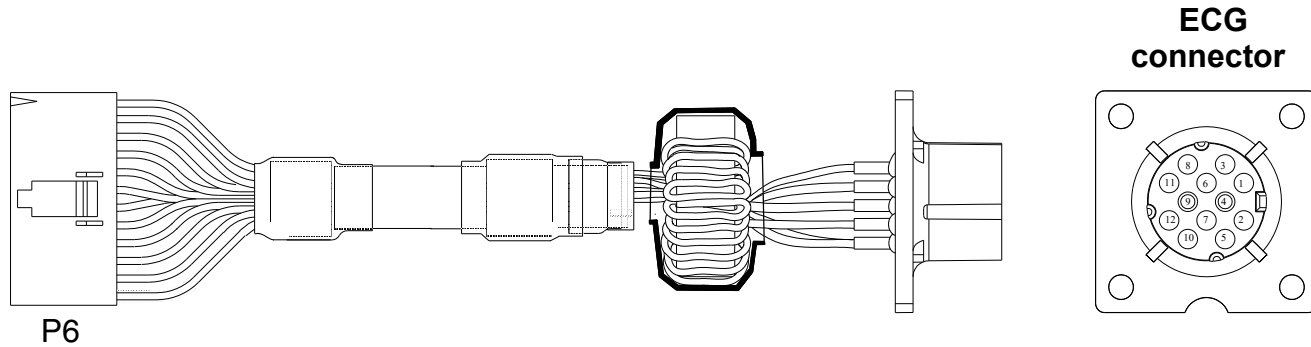
A08 Backlight PCB

A05 Interface PCB

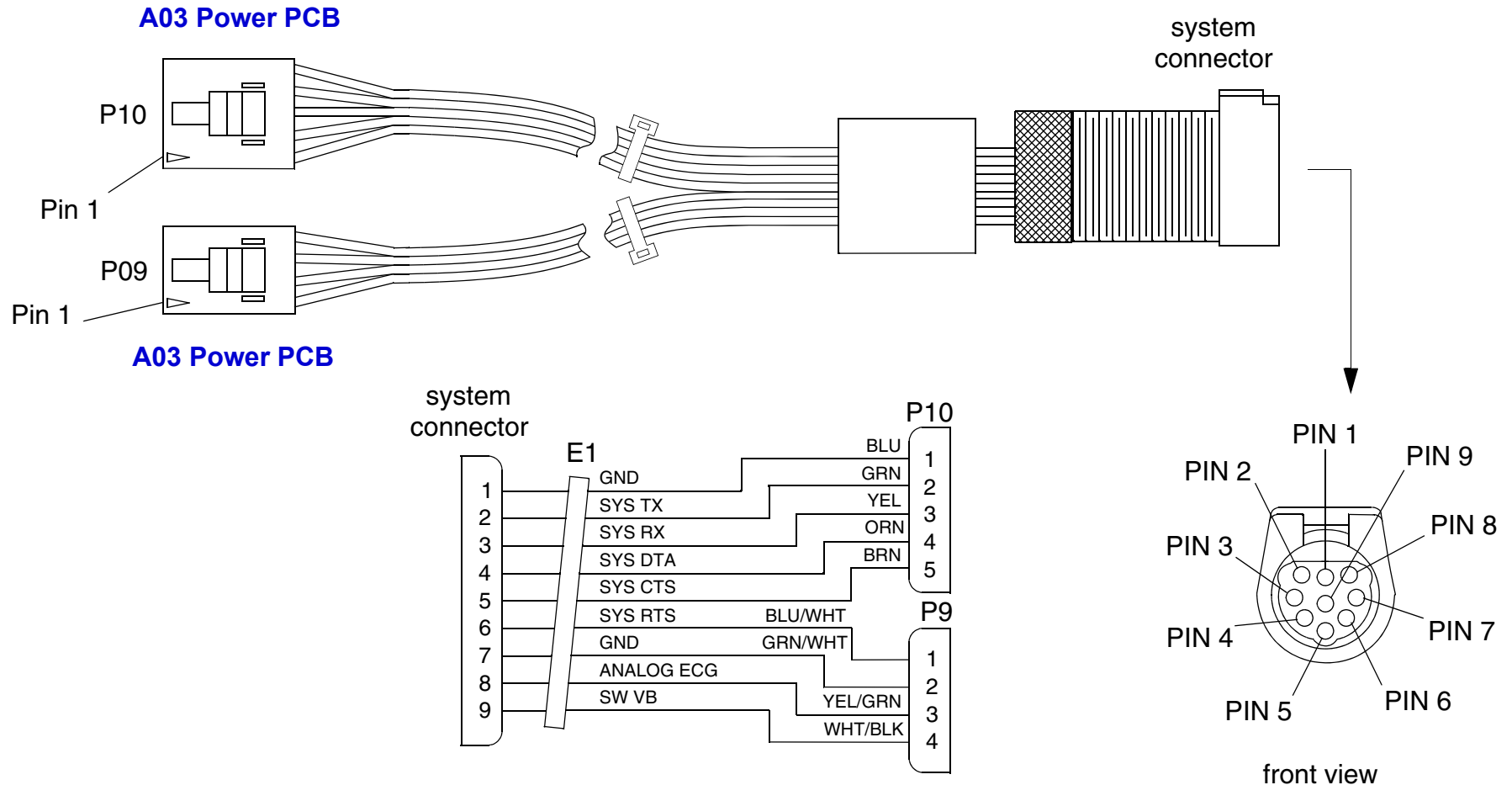


W07 ECG Connector Cable — MIN **3007991**

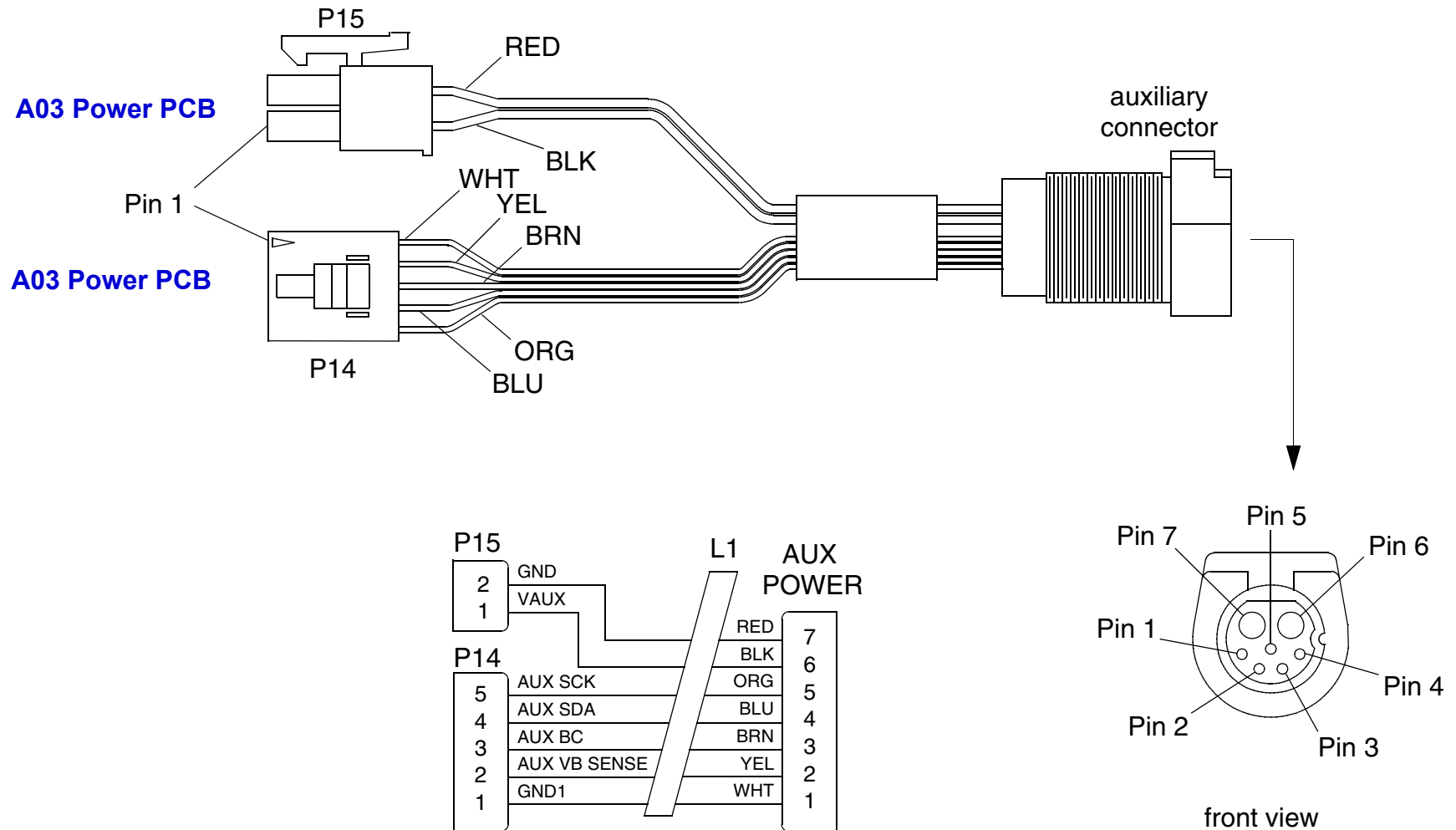
A01 System PCB



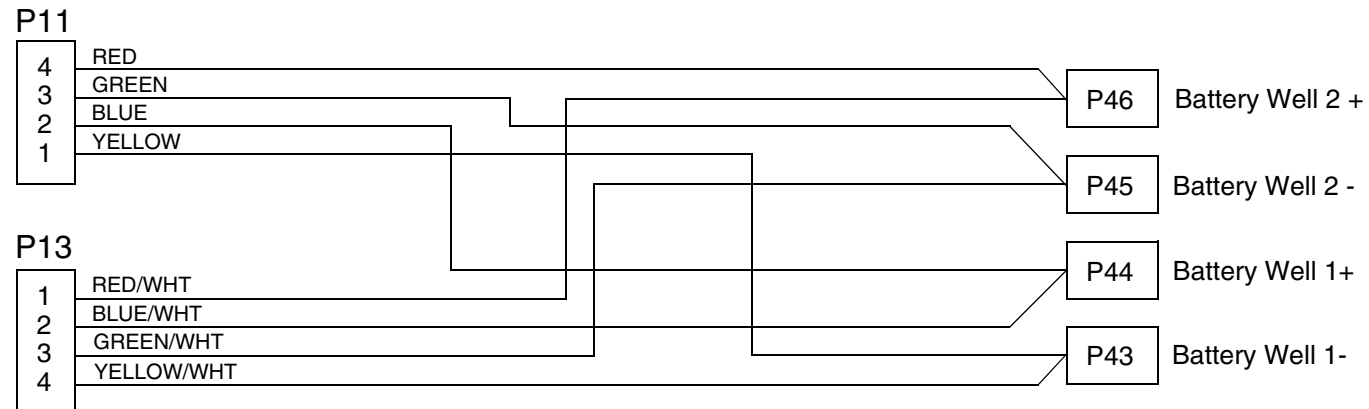
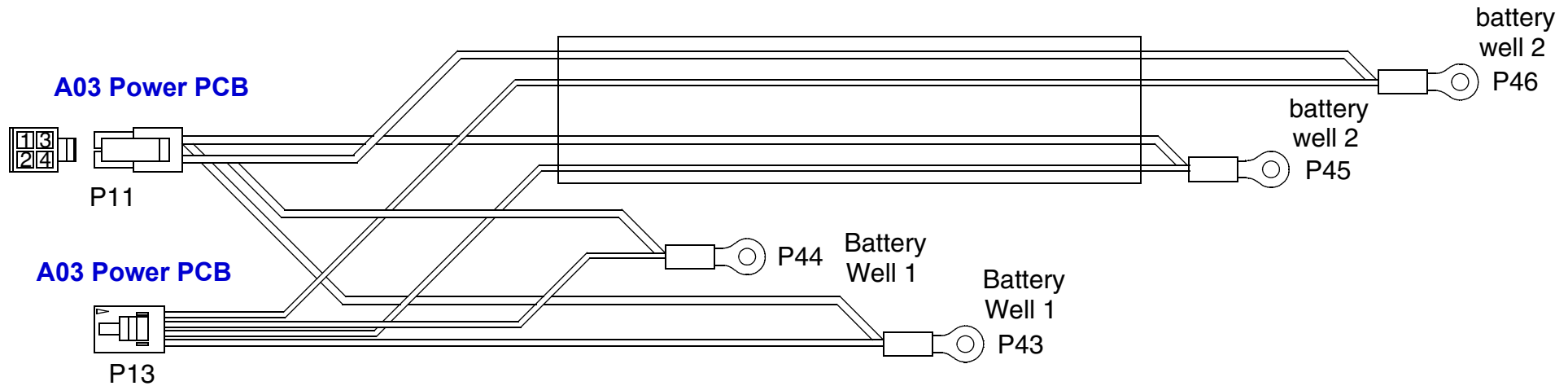
W08 System Connector Cable — MIN 3009652



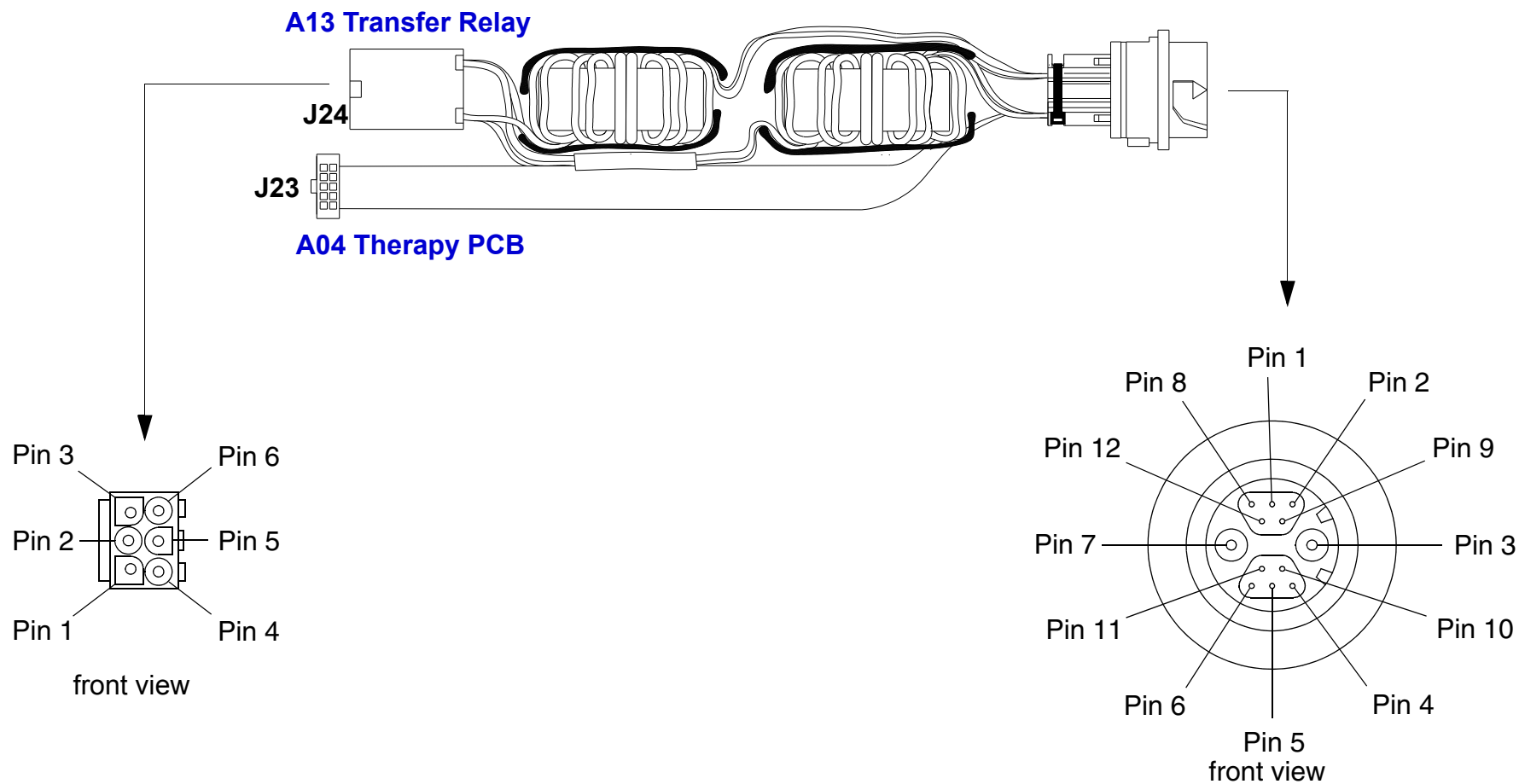
W09 Auxiliary Connector Cable — MIN 3008392



W10 Battery Pins/Power PCB Cable — MIN 3009726

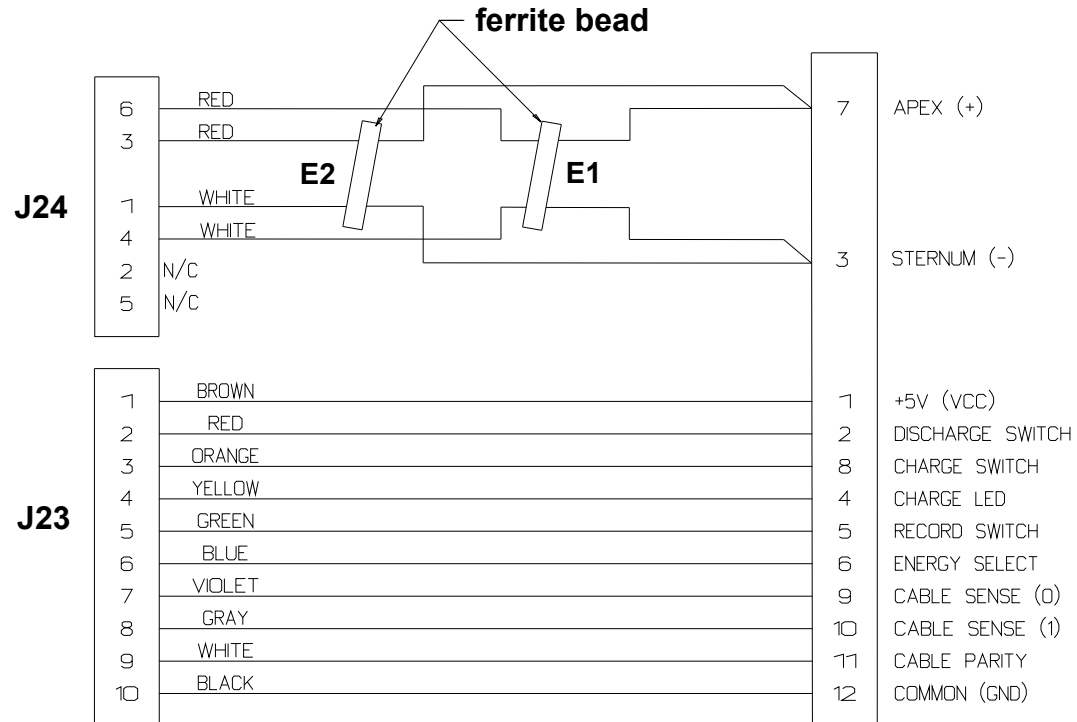


W11 Therapy Connector Cable — MIN **3006216**

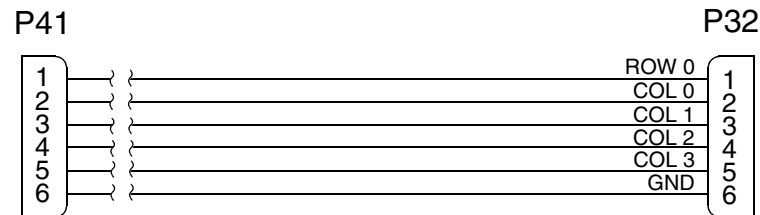
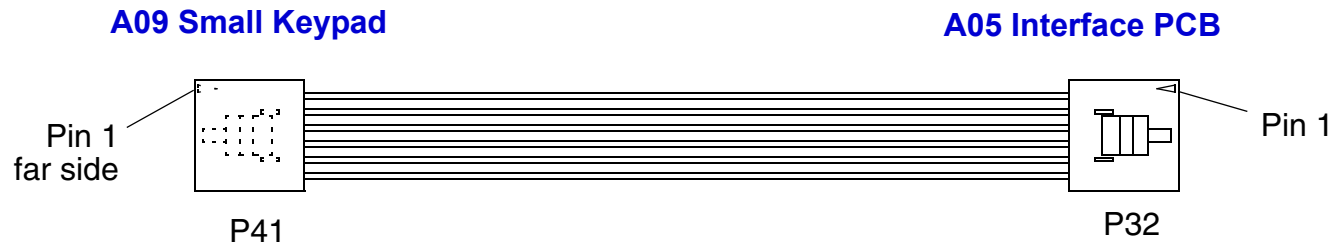


(Continued on next page)

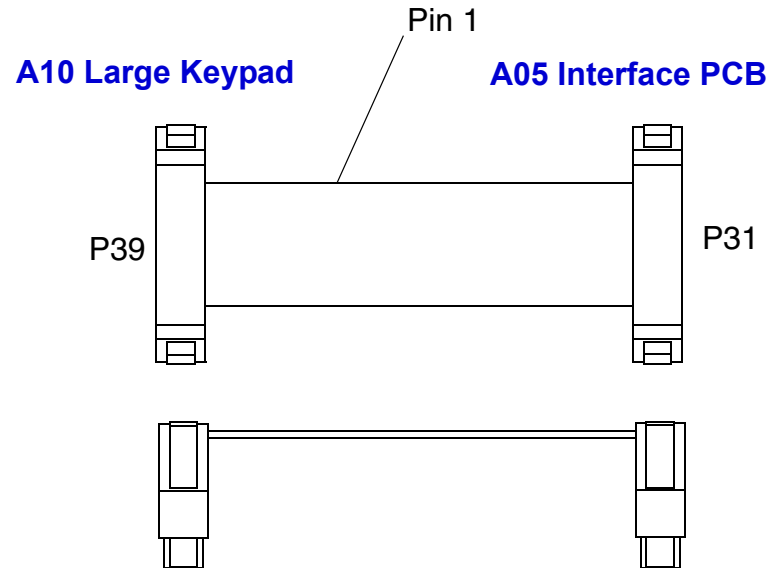
W11 Therapy Connector Cable (continued)



W12 Small Keypad/Interface PCB Cable — MIN **3009726**

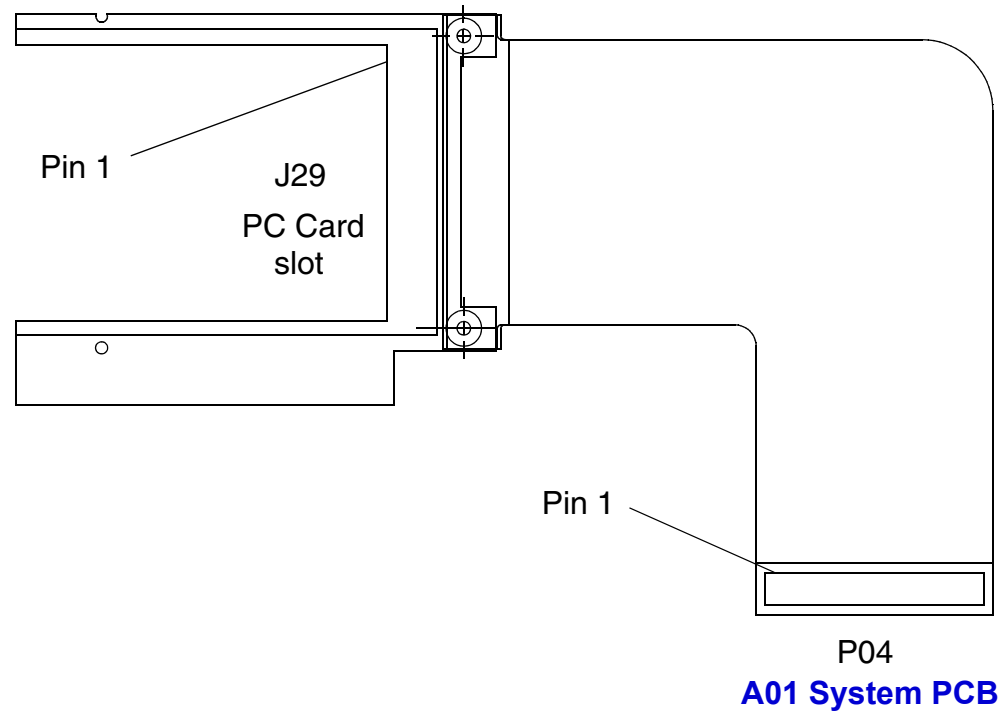


W13 Large Keypad/Interface PCB Cable — MIN 3009677



P39		P31
1	GND	1
2	SHOCK LED	2
3	SYNC LED	3
4	PACING LED	4
5	NIBP LED	5
6	ALARMS LED	6
7	TRIM LED	7
8	ANALYZE LED	8
9	ADVISORY LED	9
10	ROW 1	10
11	ROW 2	11
12	ROW 3	12
13	ROW 4	13
14	ROW 5	14
15	COL 0	15
16	COL 1	16
17	COL 2	17
18	COL 3	18
19	COL 4	19
20	VCC	20
21	CHG LED	21
22	PWR LED	22
23	PWR SW*	23
24	SERVICE LED	24
25	XREQ2	25
26	GND	26

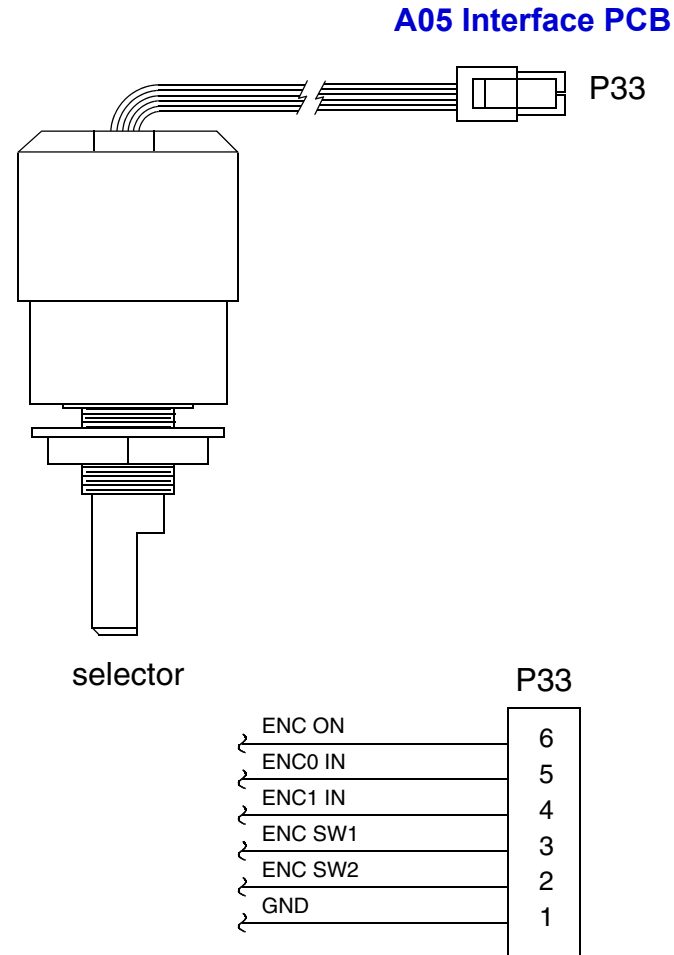
W14 System PCB/PC Card Slot Cable — MIN **3009276**

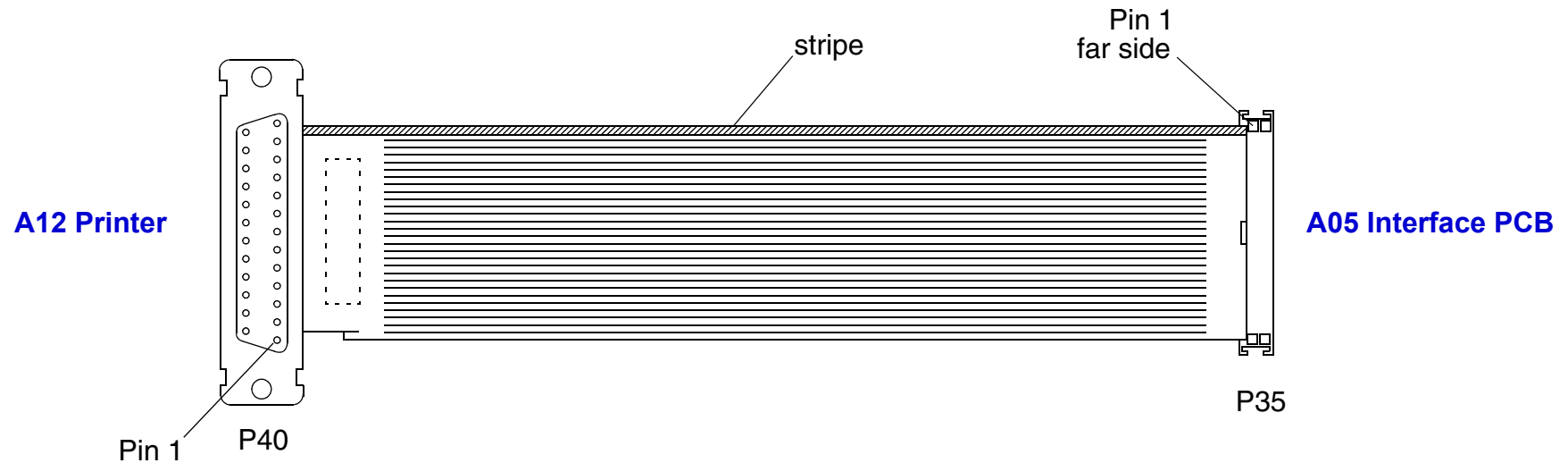


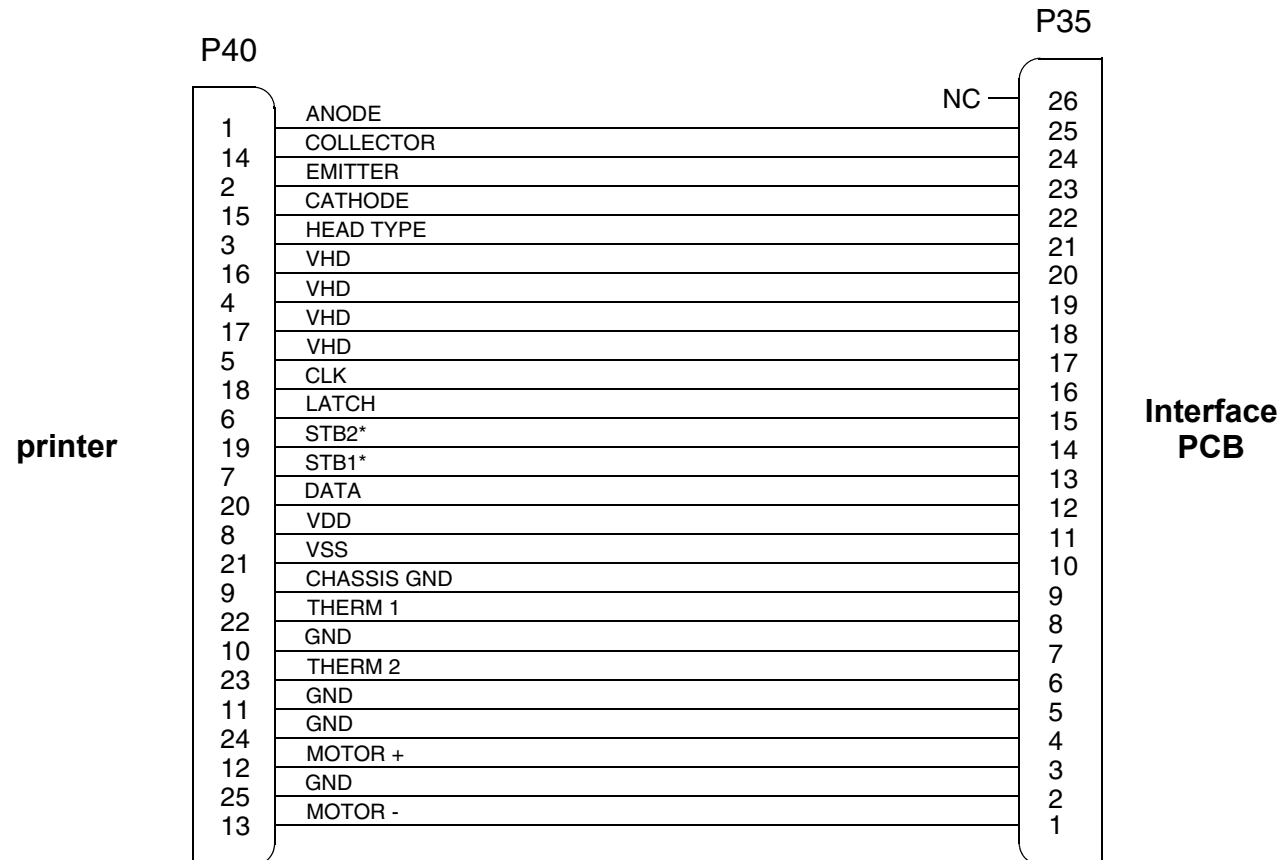
W14 System PCB/PC Card Slot Cable *(continued)*

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	-	-	-

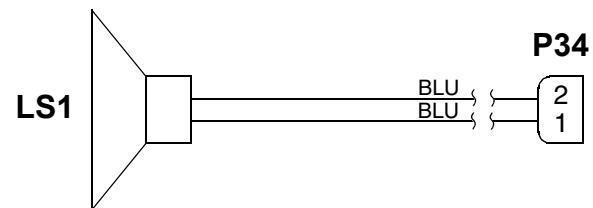
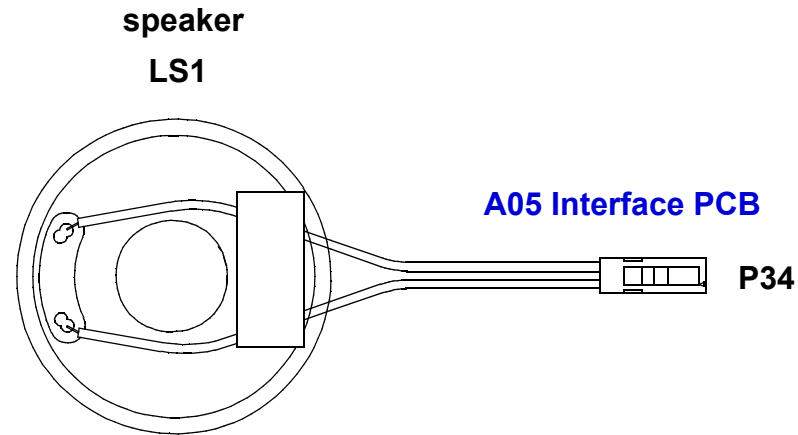
W15 Selector Assembly — MIN 3011128



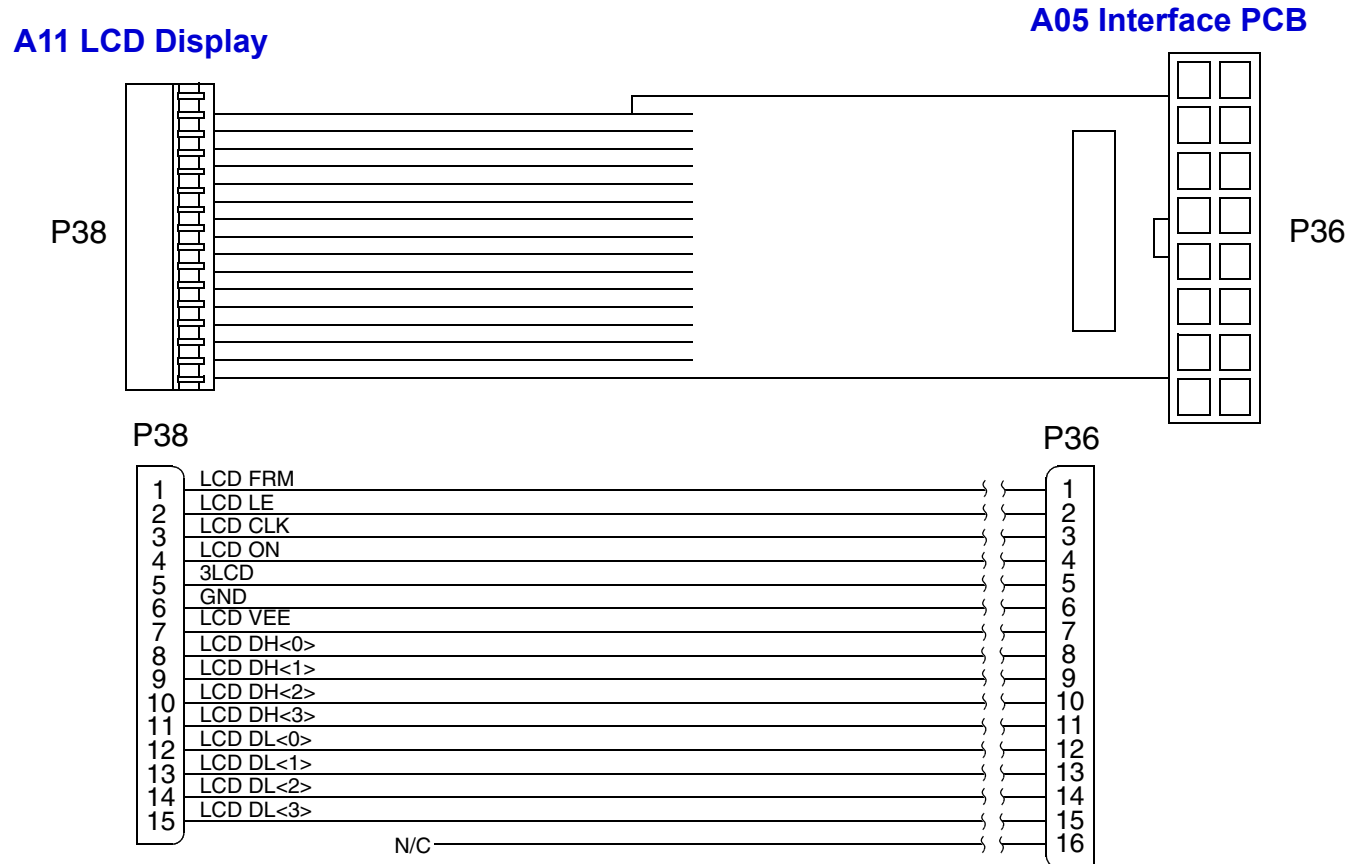
W16 Printer Assembly/Interface PCB Cable — MIN **3009724**

W16 Printer Assembly/Interface PCB Cable *(continued)*

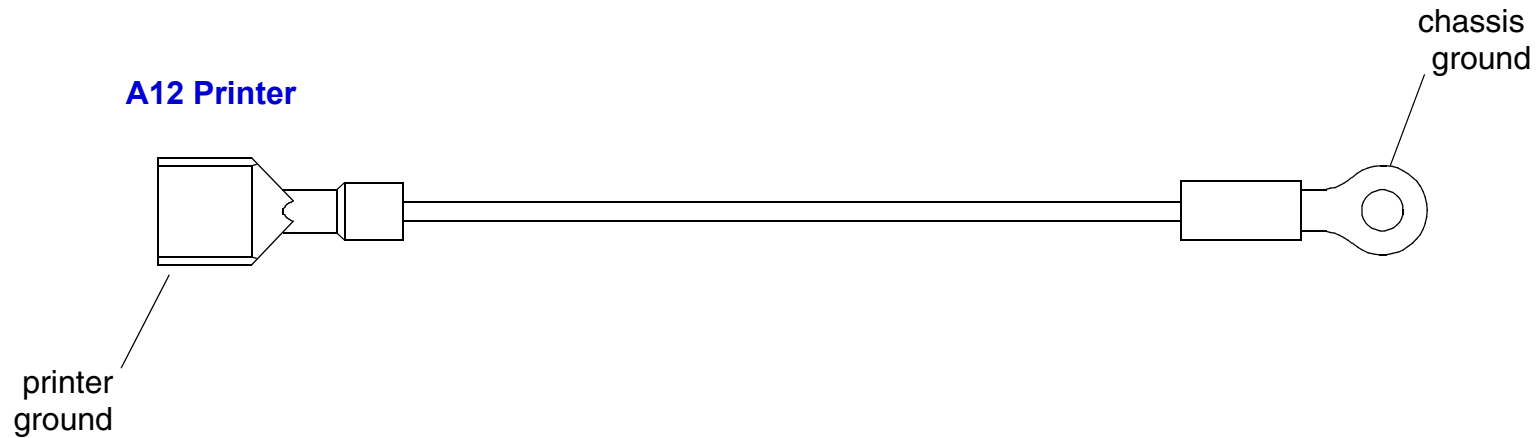
W17 Speaker Assembly — MIN **3009726**



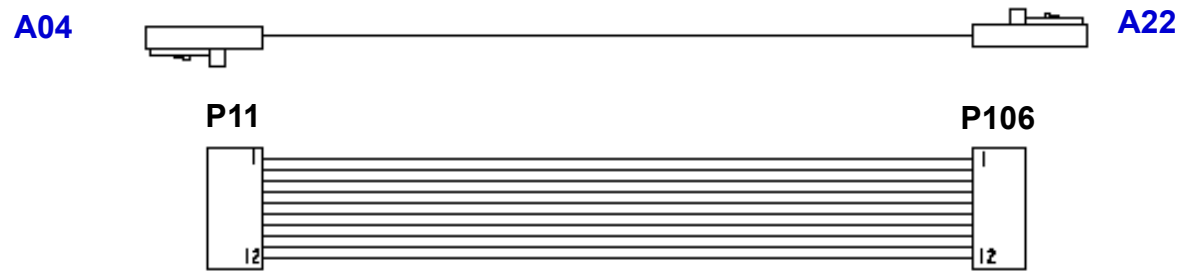
W18 LCD Assembly/Interface PCB Cable — MIN **3009701**



W19 Printer Assembly/Chassis Ground Cable — MIN **3009726**



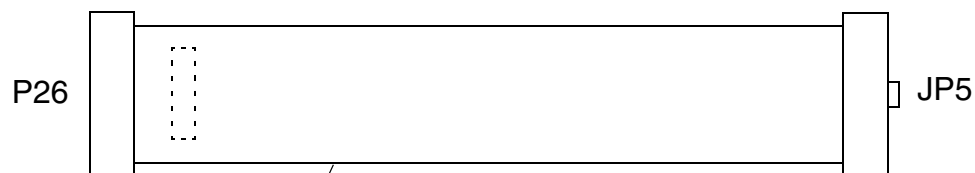
W20 Biphasic to Therapy PCB Flex Cable — MIN **3011792**



W21 OEM PCB/SpO2 Module Cable, Nellcor — MIN **3009700**

A06 OEM PCB

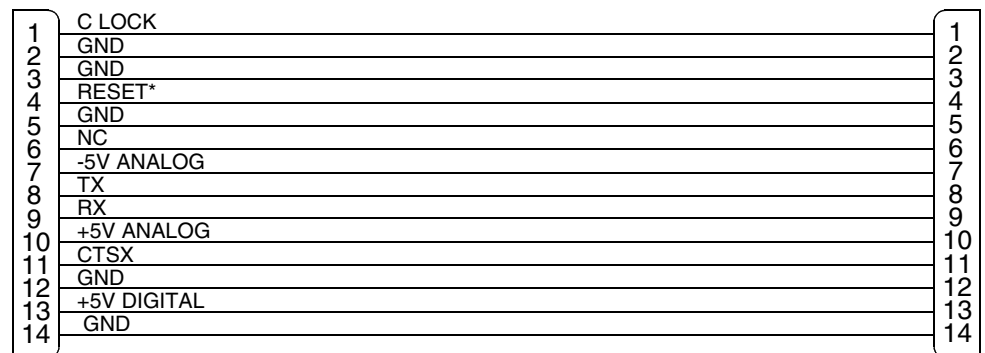
A16 SpO2 Module



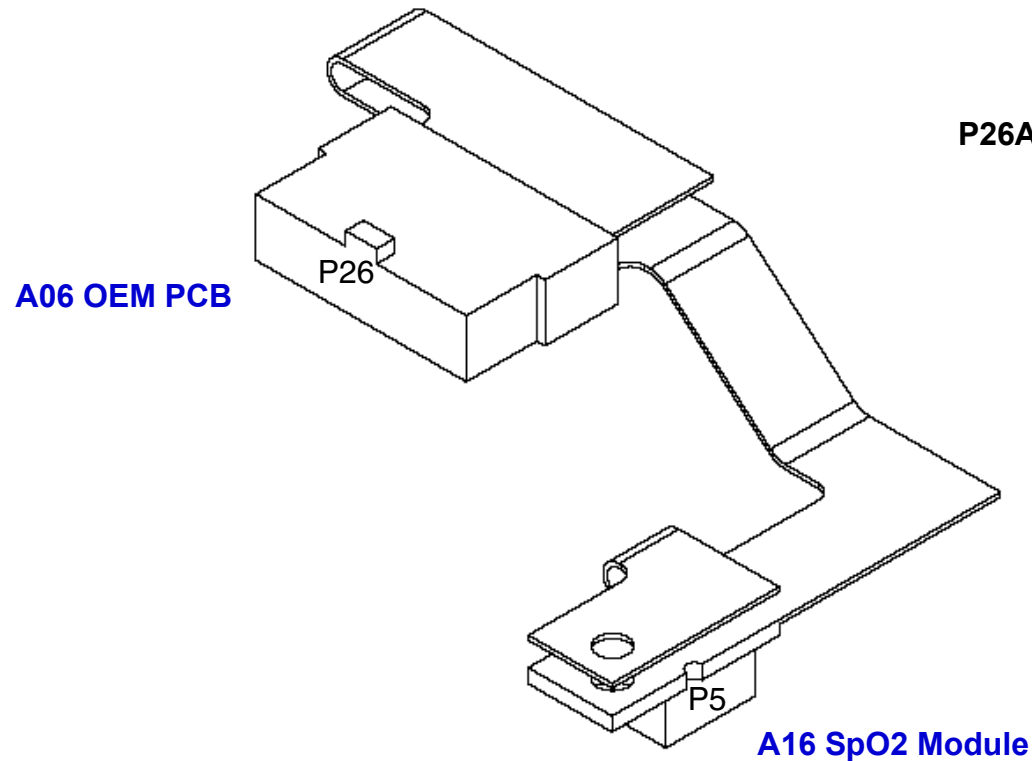
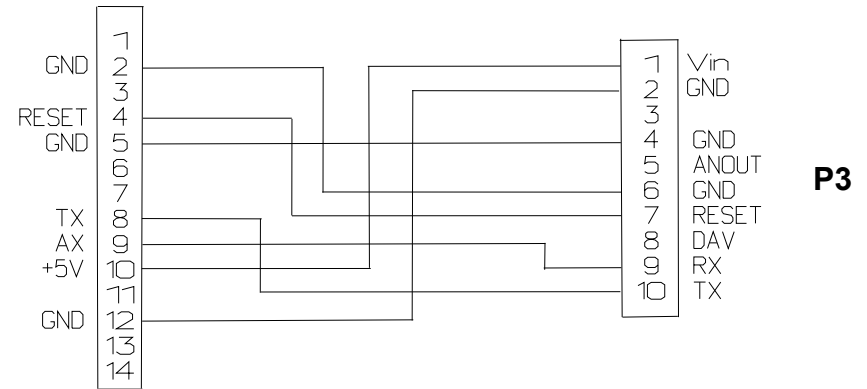
P26

Pin 1

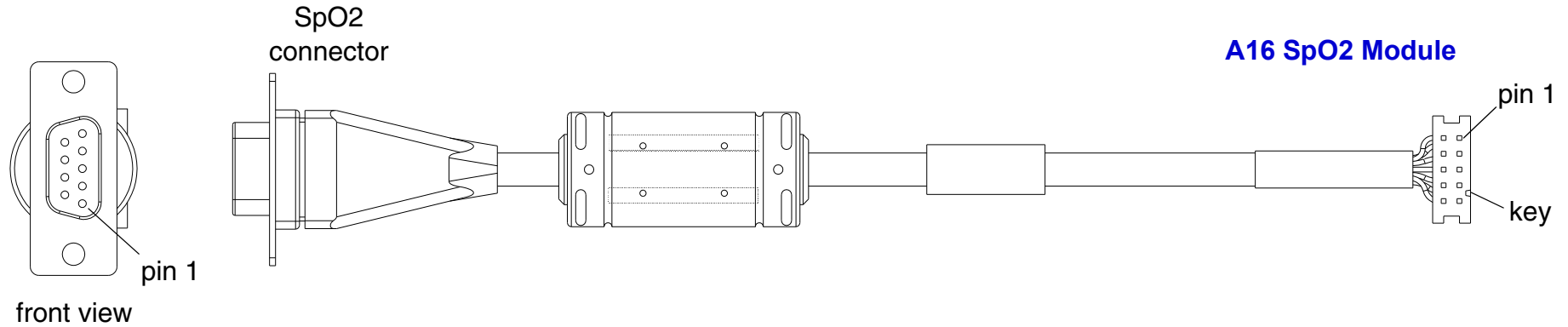
JP5



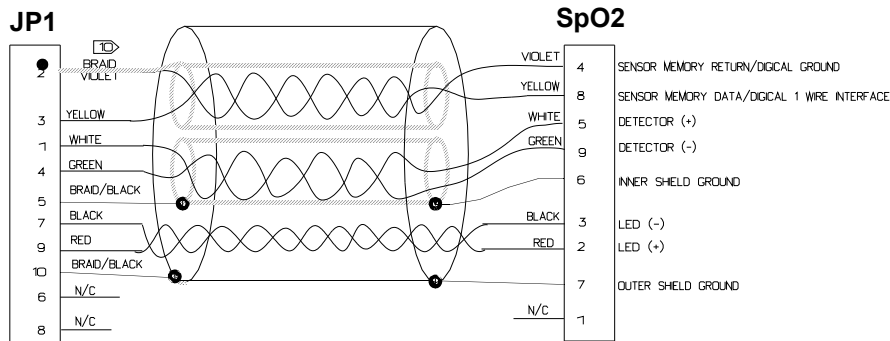
W21 OEM PCB/SpO2 Module Cable, Masimo — MIN **3203607**

**P26A**

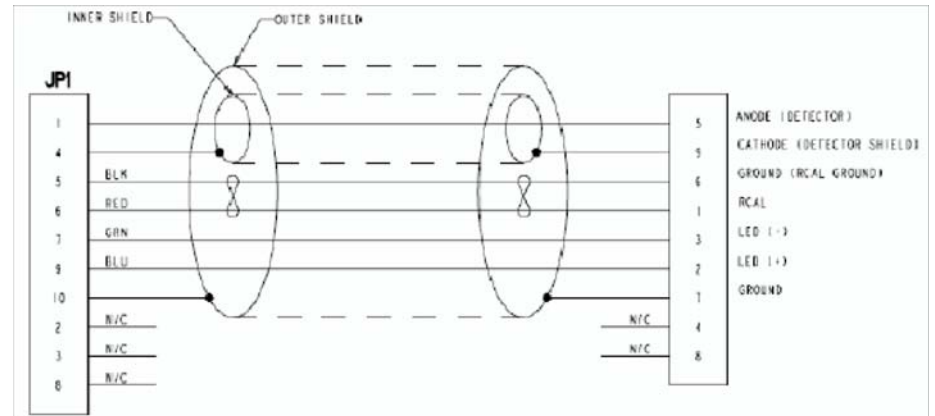
W22 SpO2 Connector Cable, Nellcor — MIN 3007993



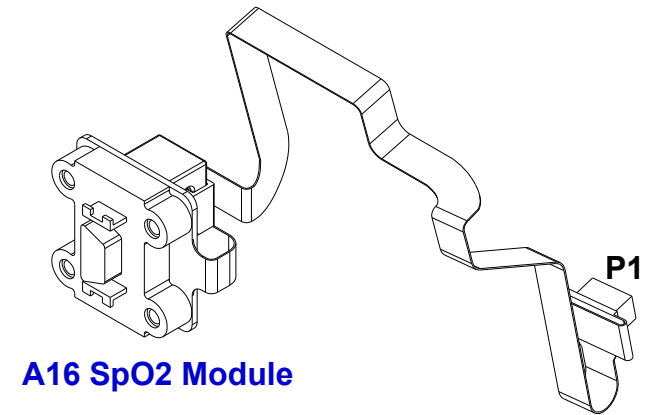
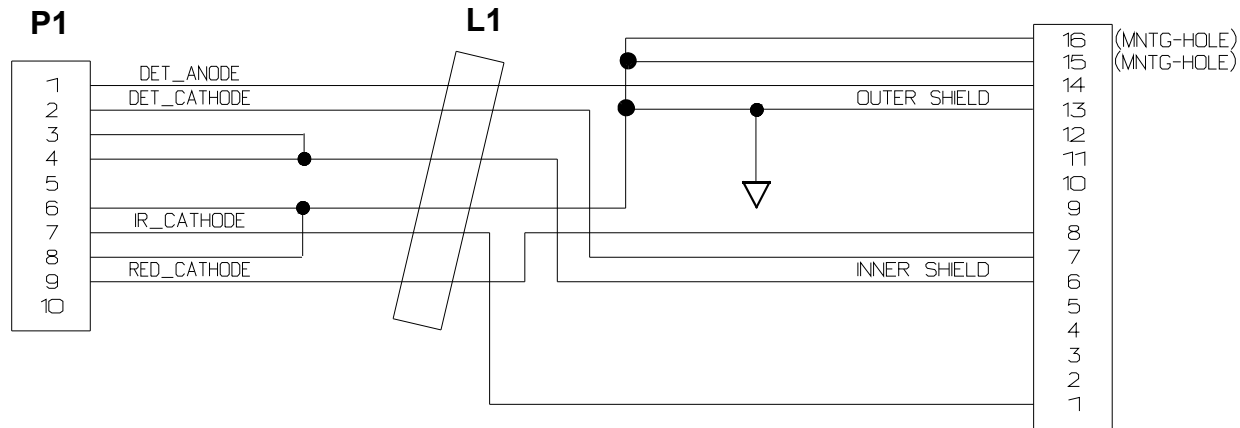
Nell-3 cable, MIN 3007993-004



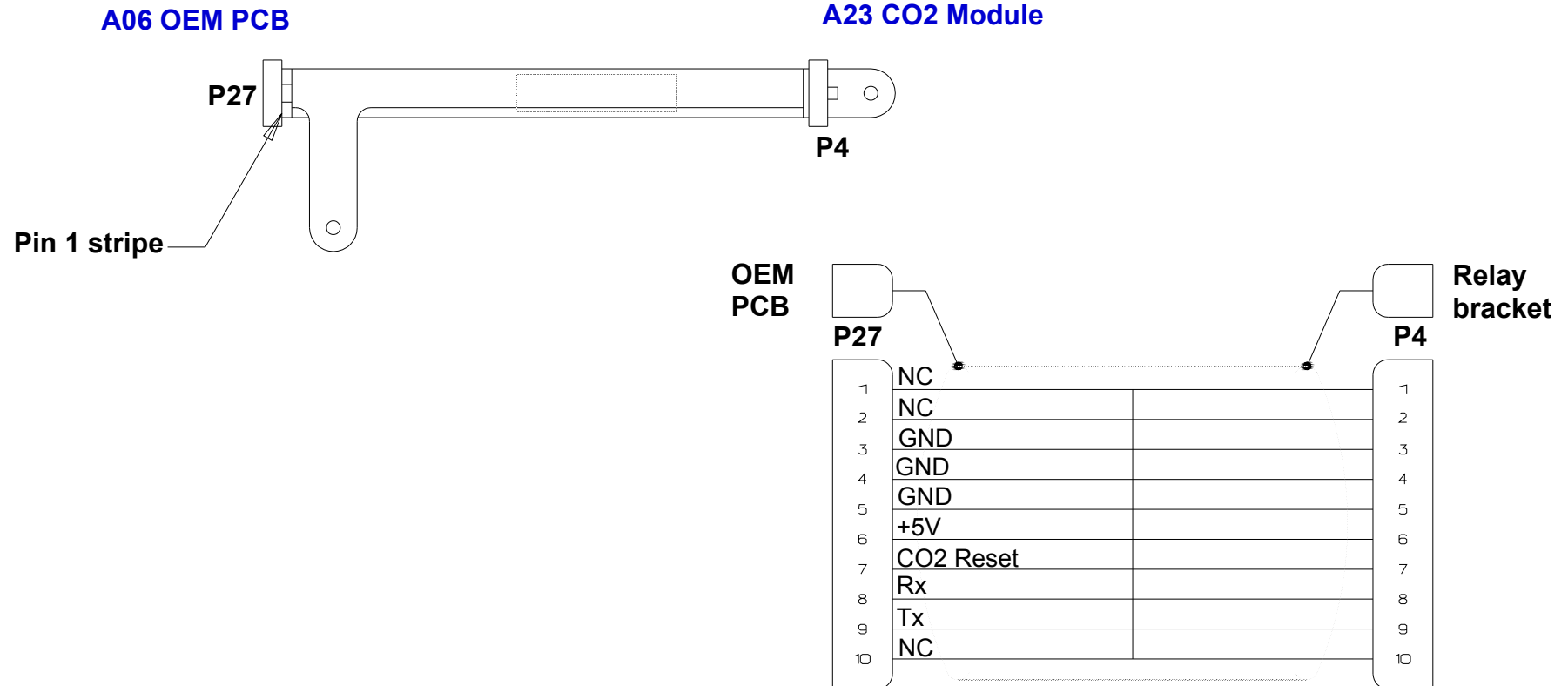
Nellcor MP-205 cable, MIN 3007993-003



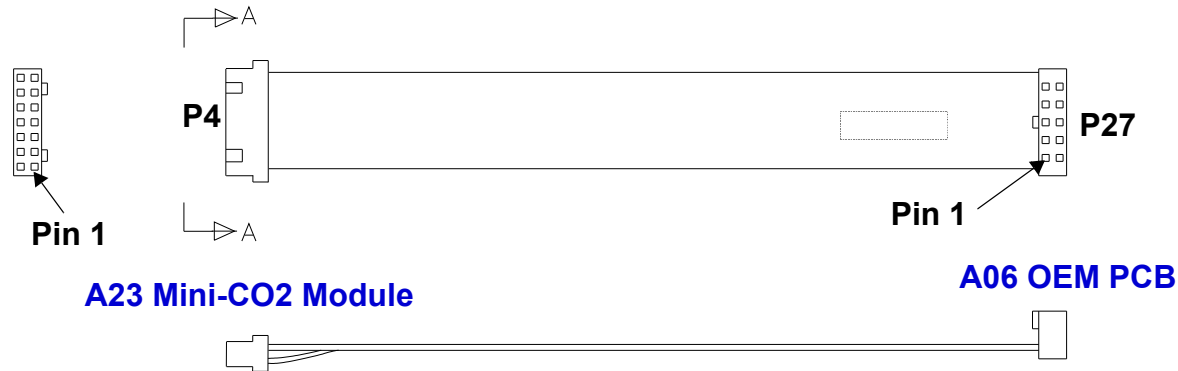
W22 SpO2 Connector Cable, Masimo — MIN **3203369**



W26 OEM PCB/CO2 Module Cable — MIN **3012181-02**



W26 OEM PCB/Mini-CO2 Module Cable — MIN **3012181-003**

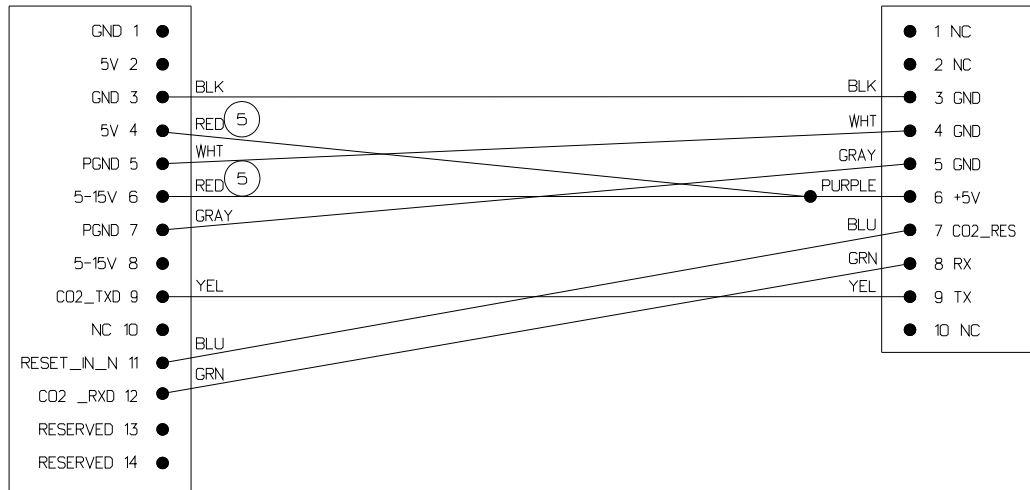


P4 (CO2 Module)

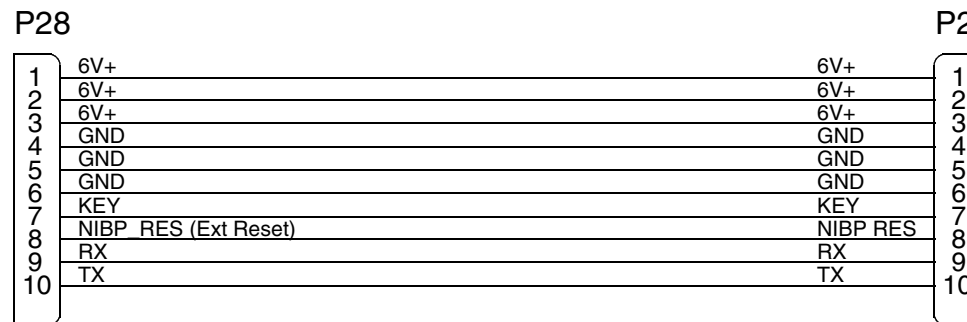
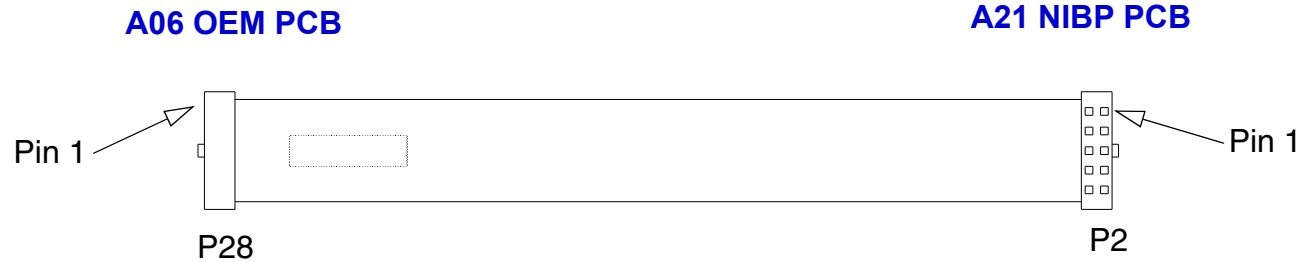
GND	1	●
5V	2	●
GND	3	●
5V	4	●
PGND	5	●
5-15V	6	●
PGND	7	●
5-15V	8	●
CO2_TXD	9	●
NC	10	●
RESET_IN_N	11	●
CO2_RXD	12	●
RESERVED	13	●
RESERVED	14	●

P27 (OEM Module)

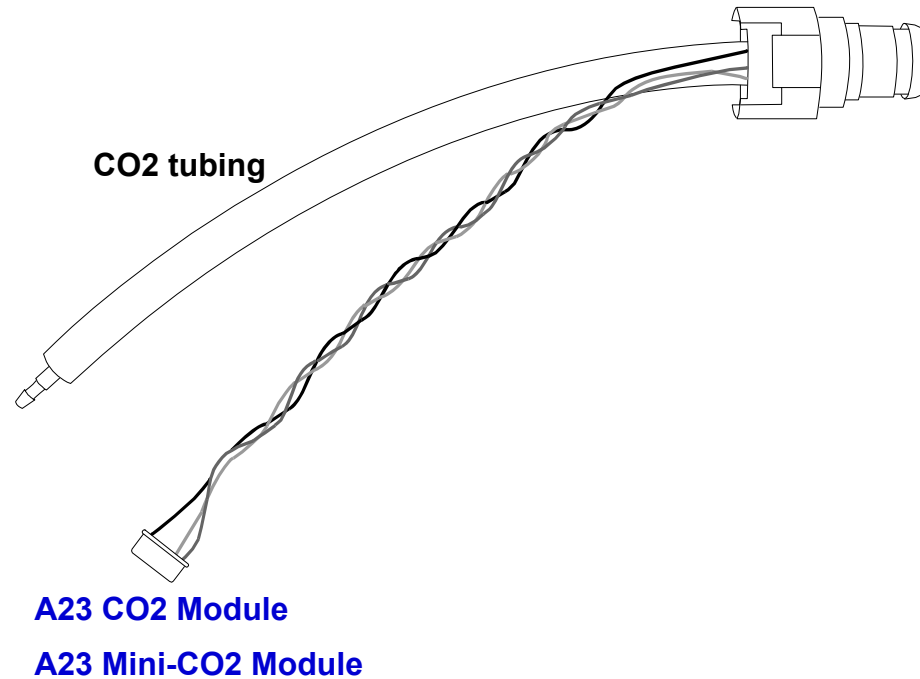
●	1	NC
●	2	NC
●	3	GND
●	4	GND
●	5	GND
●	6	+5V
●	7	CO2_RES
●	8	RX
●	9	TX
●	10	NC



W27 OEM PCB/NIBP Module Cable — MIN **3012181-00**



W28 CO2 Inlet Connector Cable — MIN **3012140**



W30 CO2 PCB Adapter Cable — MIN 3012397

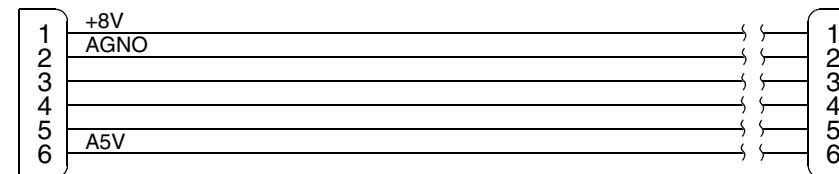
For old style CO2 module

A23 CO2 PCB

W28 Connector

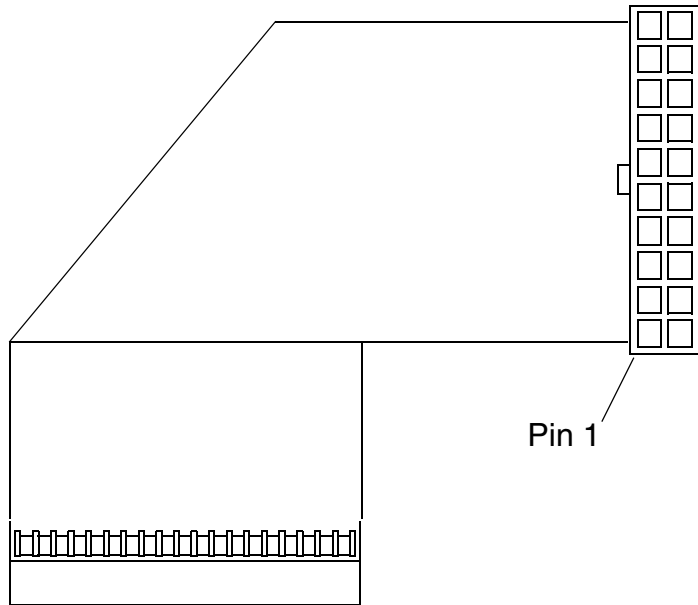


J1



W32 EL Assembly/Interface PCB Cable — MIN 3012736

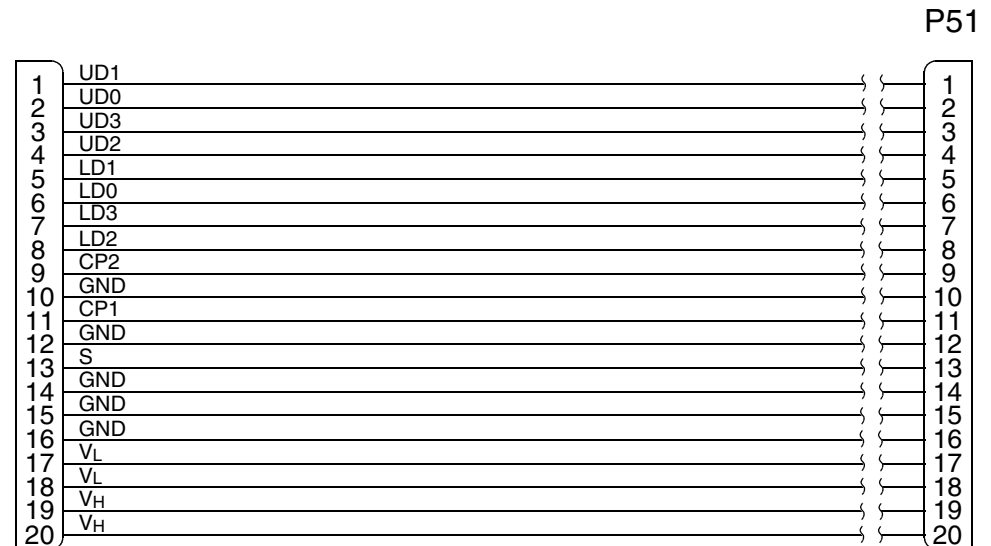
(EL only – part of A11)



A11 EL Display

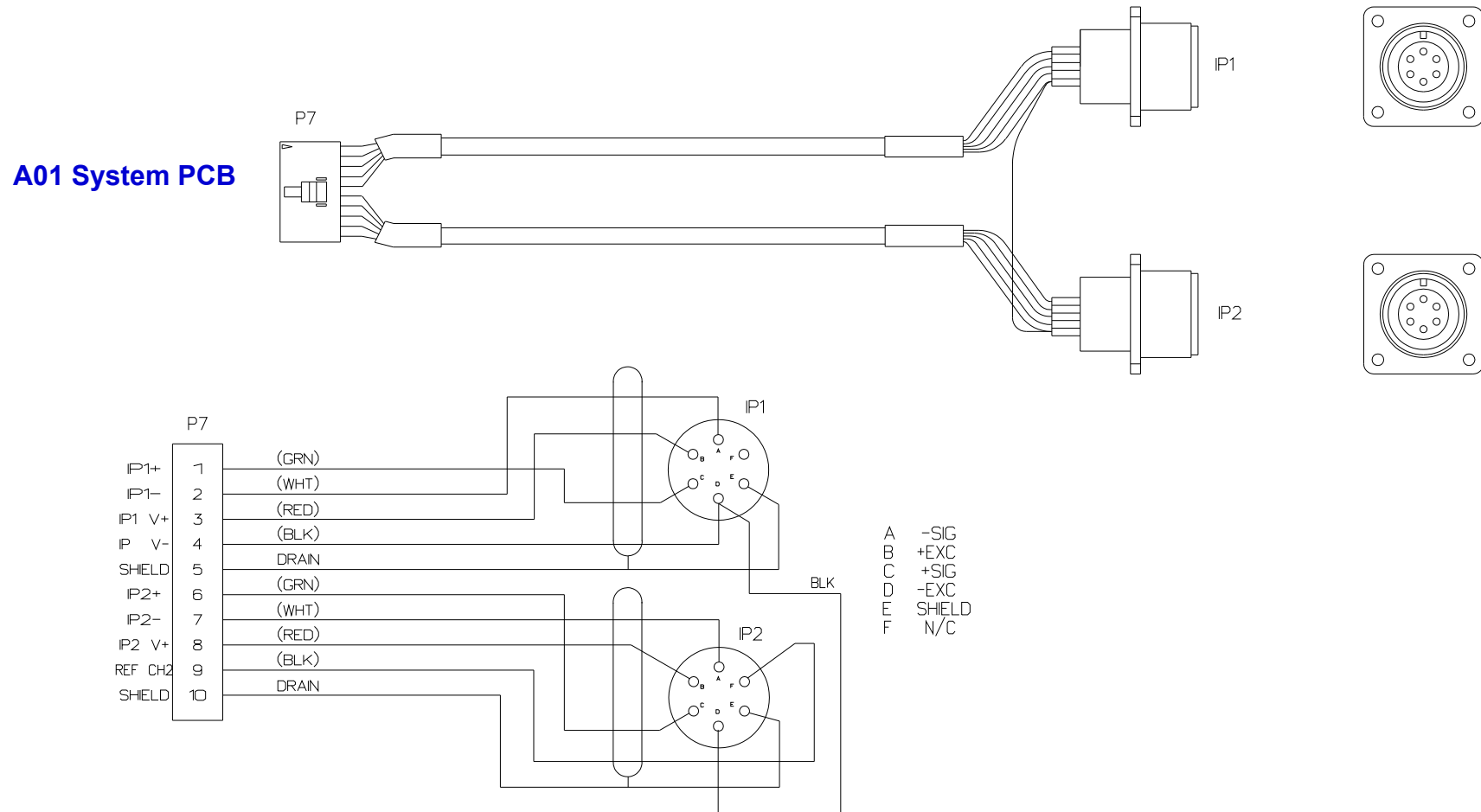
A05 Interface PCB

P51



P51

W33 Invasive Pressure Assembly — MIN 3200466



Repair Kits

The repair kits include components that support a particular replacement activity.

Due to the need for special tooling and processes, the front and rear case repair kits come partially assembled from the factory.

MIN	Part Description	Note	CAT.
3011608-00	Front Case Repair Kit—LCD Devices		40998-000117
3011608-04	Backlight PCB Repair Kit		40998-000123
3011608-05	External Hardware Repair Kit		40998-000124
3011608-06	Internal Hardware Repair Kit		40998-000125
3011608-07	System/Therapy PCB Hardware Repair Kit		40998-000126
3011608-08	Paddle Retainer Repair Kit		40998-000127
3011608-10	CO2 Door Repair Kit		40998-000129
3011608-023	Nellcor 205 SpO2 Connector Cable Repair Kit		40998-000121
3011608-024	OEM/Foam/Bracket Repair Kit	for large CO2 Module	40998-000131
3011608-025	Front Case Repair Kit—EL Display Devices		40998-000220
3011608-026	Masimo SpO2 Connector Cable Repair Kit		40998-000221

(Continued on next page)

Repair Kits *(continued)*

MIN	Part Description	Note	CAT.
3011608-036	ECG Connector Cable Repair Kit		40998-000234
3011608-037	Therapy Connector Repair Kit		40998-000235
3011608-039	100 mm Printer Repair Kit		40998-000238
3011608-040	LCD Display Repair Kit		40998-000239
3011608-041	Rear Case Repair Kit		40998-000240
3011608-042	Nellcor Nell-3 SpO2 Connector Repair Kit		40998-000241
3011608-043	OEM/Foam/Bracket Repair Kit	for Mini-CO2 Module	40998-000242
3011608-044	Therapy PCB Repair Kit (Biphasic only)		40998-000243
3011608-045	Mini-CO2 Module Repair Kit		40998-000244
3011608-046	Nellcor Nell-3 SpO2 PCB Repair Kit		40998-000246
3200493-00	Interconnect Cable Repair 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 repair kit.

Item	Qty	MIN	Part Description	Note
2	1	3006113-05	Front Case	Front Case
190	1	3006245-00	Felt, W17 Speaker Assembly	Front Case
172	1	3009065-01	Label, Physio-Control Icon	Front Case
178	1	3009790-00	Label, Screw Cover	Printer Label
212	1	3006186-04	Lens, A11 LCD Assembly	Front Case
242	1	804234-03	Seal, Case Perimeter	Front Case

Note: The following kits are also required with this kit:

External Hardware Repair Kit, [MIN 3011608-05](#)

Internal Hardware Repair Kit, [MIN 3011608-06](#)

Backlight PCB Kit, LCD Devices only — MIN 3011608-04

The following is a list of the items in this repair 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

External Hardware Kit — MIN 3011608-05

The following is a list of the items in this repair kit.

Item	Qty	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	Nylok Screw, 6-32 × .375 L	Rear Case
460	4	202253-576	Screw, 6-32 × .75 L	Used to install Therapy Connector Guard
W07	1	3007991-007	ECG Connector Cable	

Internal Hardware Kit — MIN 3011608-06

The following is a list of the items in this repair 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	10	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	1	3203920-000	Retainer Clip	For Masimo SpO2
230	45	202253-761	Nylok Screw, 4-40 × .312 L	Front/Rear Case
234	4	3205311-000	Nylok Screw Torx, 4-40 × .50 L	For Masimo SpO2 Connector
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

Internal Hardware Kit *(continued)*

Item	Qty	MIN	Part Description	Note
251	9	200266-006	Hex Standoff, 4-40 × .250 W × .375 L	A01/A02/A04 Assembly
292	2	3011630-00	Spacer, PCB	
294	1	3011629-00	Hex Insert	
296	1	202253-550	Nylok Screw, 4-40 × 1.125 L	
336	6	200804-102	Washer, Flat, .312 OD × .125 ID	
376	6	202253-730	Nylok Screw, 2-56 × .375 L	
378	1	3012180-02	NIBP Tubing	
414	2	202253-760	Nylok Screw, 4-40 × .250	For Masimo SpO2 Module
462	3	202253-763	Nylok Screw, 4-40 × .437	Parameter Bezel
466	1	3206424-000	Cable Tie Mount	Power PCB

System/Therapy PCB Hardware Kit — MIN 3011608-07

The following is a list of the items in this repair kit.

Item	Qty	MIN	Part Description	Note
36	1	3009412-00	Plug, Front Panel	
230	18	202253-761	Nylok Screw 4-40 × .312 L	
232	18	201407-069	Nylok Screw 6-32 × .375 L	
296	1	202253-550	Nylok 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 repair kit.

Item	Qty	MIN	Part Description	Note
28	2	3006766-02	Cover, Latch, Paddle	
174	1	3009789-002	Label, Left Latch Cover	
176	1	3009789-003	Label, Right Latch Cover	
232	6	201407-069	Nylok Screw 6-32 × .375 L	

CO2 Door Repair Kit — MIN 3011608-10

The following is a list of the items in this repair kit.

Item	Qty	MIN	Part Description	Note
		3201213-00	CO2 Door Repair Tool	
196	1	804447-21	Foam Spacer	
354	1	3012119-02	CO2 Connector Adapter	
356	1	3012120-03	CO2 Connector Cover	
360	1	3007997-01	Seal, Connector	
376	4	202253-730	Nylok Screw, 2-56 × .375 L	

W22 Nellcor MP-205 SpO2 Connector Cable Kit — MIN 3011608-023

The following is a list of the items in this repair kit.

Item	Qty	MIN	Part Description	Note
W22	1	3007993-003	SpO2 Connector Cable	Nellcor MP-205 SpO2 Option
206	1	3007996-01	Gasket, W22 SpO2 Connector Cable	Nellcor MP-205 SpO2 Option

Note: The following kits are also required with this kit:

External Hardware Repair Kit, [MIN 3011608-05](#)

Internal Hardware Repair Kit, [MIN 3011608-06](#)

OEM/Foam/Bracket Repair Kit — MIN 3011608-024

The following is a list of the items in this repair kit.

Item	Qty	MIN	Part Description	Note
20	1	3012122-003	Lower Support Foam	
22	1	3012123-003	Upper Support Foam	
46	1	3006379-003	Relay Bracket	
228	1	3010805-001	14-pin Retainer Clip	
384	1	3012421-01	OEM PCB Shield	

Front Case Kit, EL Display Devices — MIN 3011608-025

The following is a list of the items in this repair kit.

Item	Qty	MIN	Part Description	Note
2	1	3006113-06	Front Case	Front Case
172	1	3009065-01	Label, Physio-Control Icon	Front Case
178	1	3009790-00	Label, Screw Cover	Printer Label
190	1	3006245-00	Felt, W17 Speaker Assembly	Front Case
212	1	3006186-008	Lens, A610 Color, 980 Hardcoat	Front Case
242	1	804234-03	Seal, Case Perimeter	Front Case

Note: The following kits are also required with this kit:

External Hardware Repair Kit, [MIN 3011608-05](#)

Internal Hardware Repair Kit, [MIN 3011608-06](#)

Masimo SpO2 Connector Cable Kit — MIN 3011608-026

The following is a list of the items in this repair kit.

Item	Qty	MIN	Part Description	Note
W22	1	3203369-001	SpO2 Cable Assembly	
234	4	3205311-000	Pan Torx, Nylok Screw, 4-40 × .500 L	
412	1	3203956-000	Housing, Ferrite	
414	1	202253-760	Nylok Screw, 4-40 × .250 L	

Note: The following kits are also required with this kit:
External Hardware Repair Kit, [MIN 3011608-05](#)
Internal Hardware Repair Kit, [MIN 3011608-06](#)

ECG Connector Cable Kit — MIN 3011608-036

The following is a list of the items in this repair kit.

Item	Qty	MIN	Part Description	Note
W07	1	3007991-007	ECG Connector Cable	
236	1	805915-01	Seal, W07 ECG Receptacle	
462	4		Screw, 4-40 x .437	
464	2		Bracket, Cable Support	

Note: The following kits are also required with this kit:
External Hardware Repair Kit, [MIN 3011608-05](#)
Internal Hardware Repair Kit, [MIN 3011608-06](#)

Therapy Connector Kit — MIN 3011608-037

The following is a list of the items in this repair kit.

Item	Qty	MIN	Part Description	Note
W11	1	3006216-005	Therapy Connector Assembly	
218	1	200040-001	Therapy Connector Cable Snap Ring (C-Clip)	
238	1	3203445-000	Therapy Connector Seal	

Note: The following kit is also required with this kit:
External Hardware Repair Kit, [MIN 3011608-05](#)

100-mm Printer Kit — MIN 3011608-039

The following is a list of the items in this repair kit.

Item	Qty	MIN	Part Description	Note
A12	1	3006229-005	100-mm Printer	
178	1	3009790-00	Label, Screw Cover	

LCD Display Kit — MIN 3011608-040

The following is a list of the items in this repair kit.

Item	Qty	MIN	Part Description	Note
A11	1	3010612-002	LCD Assembly	
467	1	3207835-000	LCD Metal Case	

Rear Case Kit — MIN 3011608-041

The following is a list of the items in this repair kit.

Item	Qty	MIN	Part Description	Note
W10	1	3009726-08	Battery Pins/A03 Power PCB Cable	Rear Case
4	1	3006114-006	Rear Case	Rear Case
16	1	3006291-00	Drain Seal	Rear Case
24	1	3006375-02	Battery Retainer	Rear Case
28	2	3006766-02	Paddle Cover Latch Assembly	Rear Case
150	1	3010591-010	Rear EMI Shield (for large CO2 module)	Rear Case
150	1	3010591-011	Rear EMI Shield (for mini-CO2 module)	Rear Case
156	1	804194-00	A15 Energy Storage Capacitor Mount Cover Label	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	Adhesive capacitor pad, 3.0 W × 2.0 H × 0.1 T	Rear Case

Rear Case Kit *(continued)*

Item	Qty	MIN	Part Description	Note
202	4	802885-00	Mounting Foot	Rear Case
208	4	804206-01	Battery Grommet	Rear Case
216	4	201508-000	Carbon Steel Lock Nut, 4-40 Thread	Rear Case
224	1	200536-011	Cable Tie, Nylon, 21-inch	Rear Case
232	13	201407-069	Nylok Screw, 6-32 x .375 L	
240	2	200060-011	System and Aux Connector O-ring Seals	Rear Case
266	1	3203396-000	Sponge, with Adhesive	Rear Case
288	1	3011526-001	Oximeter Patent Label (Masimo)	SpO2 Assembly (Battery Well 1)
288	1	3011526-003	Oximeter Patent Label (Nell-3)	SpO2 Assembly (Battery Well 1)
288	1	3011526-00	Oximeter Patent Label (Nellcor)	SpO2 Assembly (Battery Well 1)
303	1	804447-33	Adhesive Part, 1.0 W x 3.0 H x .125 T	Rear Case (Monophasic Only)
340	1	3012209-00	CO2 Exhaust Seal	Rear Case

(Continued on next page)

Rear Case Kit *(continued)*

Item	Qty	MIN	Part Description	Note
342	1	3012178-00	CO2 Exhaust Cover Label, with CO2	Rear Case
342	1	3012178-01	CO2 Exhaust Cover Label, without CO2	Rear Case
462	3	202253-763	Nylok Screw, 4-40 × .437 L	
466	1	3206424-000	Cable Tie Mount	

Note: The following kits are also required with this kit:
 External Hardware Repair Kit, [MIN 3011608-05](#)
 Internal Hardware Repair Kit, [MIN 3011608-06](#)

W22 Nell-3 SpO2 Connector Cable Kit — MIN 3011608-042

The following is a list of the items in this repair kit.

Item	Qty	MIN	Part Description	Note
W22	1	3007993-004	SpO2 Connector Cable	
206	1	3007996-01	Gasket, W22 SpO2 Connector Cable	

Note: The following kits are also required with this kit:
External Hardware Repair Kit, [MIN 3011608-05](#)
Internal Hardware Repair Kit, [MIN 3011608-06](#)

OEM/Foam/Bracket Repair Kit — MIN 3011608-043

The following is a list of the items in this repair kit.

Item	Qty	MIN	Part Description	Note
20	1	3012122-004	Lower Foam, Mini-CO2 Module	
22	1	3012123-004	Upper Foam, Mini-CO2 Module	
46	1	3006379-003	Relay Bracket	
228	1	3010805-001	14-pin Retainer Clip	
384	1	3012421-01	OEM PCB Shield	

Therapy PCB Kit, Biphasic Devices — MIN 3011608-044

The following is a list of the items in this repair kit.

Item	Qty	MIN	Part Description	Note
A04	1	3006235-014	Therapy PCB Assembly, Biphasic	
W05	1	3009678-007	Power PCB/Contact PCB Cable	
144	1	3009558-002	Option Shield	
150	1	3010591-010	Rear EMI Shield	for large CO2 Module
150	1	3010591-011	Rear EMI Shield	for Mini-CO2 Module
336	2	200804-102	Flat Washer, .312 OD × .125 ID	

Note: The following kit is also required with this kit:
System/Therapy PCB Hardware Repair Kit, [MIN 3011608-07](#)

Mini-CO2 Module Kit — MIN 3011608-045

The following is a list of the items in this repair kit.

Item	Qty	MIN	Part Description	Note
A23	1	3012140-006	Mini-CO2 Module	
W01	1	3009677-05	Power/System Cable	
W26	1	3012181-003	CO2/OEM PCB Cable	
W28	1	3012140-007	CO2 Inlet Connector Cable	
216	1	201508-000	Carbon Steel Lock Nut, 4-40 Thread	
230	1	202253-761	Nylok Screw, 4-40 × .312 L	
370	1	3012125-002	Ground Strap	
392	1	3012140-002	CO2 Exhaust Tubing	
468	1	3012140-009	Exhaust Tube Sleeve	
900	1	3207817-000	Rear EMI Shield Patch	for EMI Shield MIN 3010591-010
	1	3207262-000	Customer Letter, Oridion Mini-CO2 Module	

Note: The following kits are also required with this kit:

External Hardware Repair Kit, [MIN 3011608-05](#)

Internal Hardware Repair Kit, [MIN 3011608-06](#)

OEM/Foam/Bracket Repair Kit, [MIN 3011608-043](#)

Nell-3 SpO2 PCB Kit — MIN 3011608-046

The following is a list of the items in this repair kit.

Item	Qty	MIN	Part Description	Note
A16	1	3008538-002	Nell-3 SpO2 Module	
W22	1	3007993-004	SpO2 Cable Assembly	
206	1	3007996-01	Gasket, W22 SpO2 Connector Cable	
226	1	3010805-000	10-Pin Socket Retainer Clip	
234	2	202253-729	Nylok Screw, 2-56 × .312 L	
288	1	3011526-003	Oximeter Patent Label, Nell-3	
	1	3206445-000	Customer Letter, Nellcor Sensors	

Note: The following kits are also required with this kit:

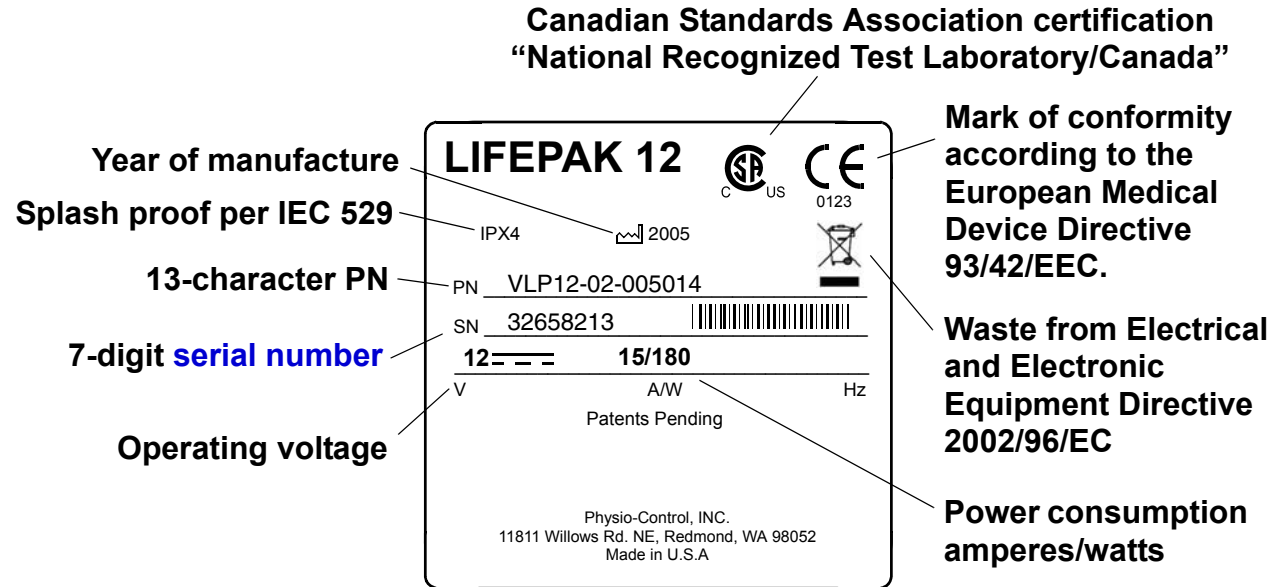
External Hardware Repair Kit, [MIN 3011608-05](#)

Internal Hardware Repair Kit, [MIN 3011608-06](#)

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.

Ordering Parts

To order parts, contact your local Physio-Control 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. See [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.

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