

Dinamap Manual



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DINAMAP®
ProCare Monitor
Service Manual



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roCare Monitor. Some of the symbols may not appear on all equipment. NOTE The model of the Monitor determines which symbols appear on it. European authorized representative. Packaging label depicting the transportation and storage atmospheric pressure range of 500 to 1060 hPa. WASTE OF ELECTRICAL AND ELECTRONIC EQUIPMENT WEEE This symbol indicates that the waste of electrical and electronic equipment must not be disposed as unsorted municipal waste and must be collected separately. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of your equipment. Service Requirements Follow the service requirements listed below. Refer equipment servicing to GE Medical Systems Information Technologies authorized service personnel only. Any unauthorized attempt to repair equipment under warranty voids that warranty. It is the user's responsibility to report the need for service to GE Medical Systems Information Technologies or to one of GE's authorized agents. Failure on the part of the responsible individual, hospital or institution using this equipment to implement a satisfactory maintenance schedule may cause undue equipment failure and possible health hazards.

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Regular maintenance, irrespective of usage, is essential to ensure that the equipment will always be functional when required. Equipment ID The following graphic illustrates the components of the monitor's serial number. The ProCare Monitor is intended to monitor one patient at a time in a clinical setting. Federal law U.S. A. restricts this device to sale by or on the order of a physician. To ensure patient safety, use only parts and accessories manufactured or recommended by GE Medical Systems Information Technologies. Parts and accessories used shall meet the requirements of IEC 6060111. Disposable devices are intended for single use only. They should not be reused. Periodically, and whenever the integrity of the monitor is in doubt, test all functions. Related Manuals Service Policy The warranty for this product is enclosed with the product in the shipping carton. All repairs on products under warranty must be performed or approved by Product Service personnel. Unauthorized repairs will void the warranty. Only qualified electronics service personnel should repair products not covered by warranty. Service Contracts Extended warranties can be purchased on most products. Contact your Sales Representative for details and pricing. Assistance If the product fails to function properly, or if assistance, service or spare parts are required, contact Customer Support. Before contacting Customer Support, it is helpful to attempt to duplicate the problem and to check all accessories to Manual Title 2009360001 DINAMAP ProCare Operation Manual Prior to calling, please be prepared to provide. To facilitate prompt service in cases where the product has external chassis or case damage, please advise the Customer Support representative when you call.

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The Customer Support representative will record all necessary information and will provide you with a Return Merchandise Authorization Number RMA. Prior to returning any product for repair, you must have a RMA number. Contact GE Medical Systems Information Technologies at 18005587044. Monday through Friday, 800 a.m. to 600 p.m. EST, excluding holidays. Packing Instructions Follow these recommended packing instructions. Remove all hoses, cables, sensors, and power cords from the monitor before packing. Pack only the accessories you are requested to return; place them in a separate bag and insert the bag and the product inside the shipping carton. Use the original shipping carton and packing materials, if available. If the original shipping carton is not available. Place the product in a plastic bag and tie or tape the bag to prevent loose particles or materials from entering openings such as hose ports. Use a sturdy corrugated container to ship the product; tape securely to seal the container for shipping. Pack with 4 to 6 in. Insurance Insurance is at the customer's discretion. The shipper must initiate claims for damage to the product. Repair Parts Repair parts can be ordered from GE

Medical Systems Information Technologies Via phone 18 005587044, or Via FAX 18004216 841 Exchange replacement assemblies such as Circuit Board Assemblies also are available; ask the Customer Support representative for details. Please allow one working day for confirmation of your order. All orders must include the following information. Facility complete name, address, and phone number. FAX number Your purchase order number.

Your GE Medical Systems Information Technologies account number Disposal of Product Waste As you use the ProCare Monitor, you will accumulate solid wastes that require proper disposal or recycling. These include batteries, patient applied parts, and packing material. Batteries CAUTION Do not incinerate batteries. The sealed, rechargeable backup battery contains lead and can be recycled. The rechargeable memory battery is of the Sealed Lead Acid form. Discharge this battery prior to disposal. Place the battery in packaging which electrically isolates its contents. Do not puncture or place the battery in a trash compact or. Do not incinerate the battery or expose it to fire or high temperatures. Dispose in accordance with regional body controlled guideline. Inspect reusable applied parts for wear, replace as necessary, and dispose of used product as medical waste in accordance with regional body controlled guideline. Packaging Material Retain original packaging materials for future use in storing or shipping the Monitor and accessories. This recommendation includes corrugated shippers and inserts. Whenever possible recycle the packaging of accessories and patient applied parts. Monitor At the end of its service life, the product described in this manual, as well as its accessories, must be disposed of in compliance with the guidelines regulating the disposal of such products. If you have questions concerning disposal of the product, please contact GE Medical Systems Information Technologies or its representatives. Monitors are available with or without integrated printers. Indicators for external DC operation from AC mains, battery operation, and battery charging are at the front of the unit. At the time of publication, the available functioning parameters included the following.

Product Configurations Each ProCare Monitor is supplied with an accessory pack. The contents of the pack vary according to model. Unpack the items carefully, and check them against the checklists enclosed within the accessory boxes. If an accessory is missing or if an item is in a nonworking condition, contact GE Medical Systems Information Technologies Customer Service immediately. It is recommended that all the packaging be retained, in case the ProCare Monitor must be returned for service in the future. The most recent entries are displayed first. Press and hold the button for 2 seconds to clear all entries stored. Front Panel 15. Silence icon when Silence button is pressed after alarm sounds silence active, silence icon bell lights to indicate that audible alarms have been silenced for 2 minutes. 16. Systemic window 3digit red LED indicates measured systolic BP in mmHg. 17. Diastolic window 3digit red LED indicates measured diastolic BP in mmHg. 18. Alarm volume indicator lights to indicate you are making a change to the alarm volume. 19. Pulse volume lights to indicate you are making a change to the pulse volume. Transportable For continuous operation. Not suitable for use in the presence of flammable anesthetics. Not for use in the presence of an oxygenenriched atmosphere oxygen tent. Type BF applied parts. IPX1, degree of protection against ingress of water. Software is developed in accordance with IEC 606011 4. This equipment is suitable for connection to public mains via power adaptors as defined in C ISPR 11. The SpO₂ parameter conforms to ISO 991920 05. Defibrillation protected. When used with the recommended accessories, the Monitor is protected against the effects of defibrillator discharge. If monitoring is disrupted by the defibrillation, the Monitor will recover.

This product conforms with the essential requirements of the Medical Device Directive. Accessories without the CE mark are not guaranteed to meet the Essential Requirements of the Medical Device Directive. 0459 ProCare 100 capable of monitoring Blood Pressure BP and Pulse.

ProCare 200 capable of monitoring Blood Pressure BP, Pulse, and Temperature. ProCare 300 Nellcor capable of monitoring Blood Pressure BP, Pulse and SPO2 Nellcor technology. ProCare 300 Masimo capable of monitoring Blood Pressure BP, Pulse and SPO2 Masimo technology. ProCare 400 Nellcor capable of monitoring Blood Pressure BP, Pulse, SPO2 Nellcor technology, and Temperature. ProCare 400 Masimo capable of monitoring Blood Pressure BP, Pulse, SPO2 Masimo technology, and Temperature. The model of your monitor determines which parameters are in your monitor. Using the ProCare Monitor, a clinician can view, print and recall data that is derived from each parameter. The Monitor is also capable of alerting the clinician to changes in the patient's condition. All of the main operations of the ProCare Monitor are easy to use and only a button touch away. Please review the factory default settings and, where applicable, enter settings appropriate for your use. Overall Principles of Operation The ProCare Monitor is a portable unit that receives power from an internal rechargeable Lead Acid Battery. The power regulators provide conditioned power from the Lead Acid Battery. The external DC source is used only to charge the Lead Acid Battery. Once the ProCare Monitor is energized, a self-test is performed. The self-test automatically tests the main functions of the ProCare Monitor. Failure of the self-test will set the ProCare Monitor into a fail-safe mode with an audio alarm.

Under normal operating conditions, the ProCare Monitor is ready to record the patient vital signs using the external attachments the temperature probe, SPO2 sensor, and cuff. Interface with a central station or other device is accomplished through the host communication port on the back of the ProCare Monitor. NOTES Prior to each use, inspect the power supply cord to ensure proper connection and condition. Be sure to unplug the Monitor before transport. The analog signals are routed to the SpO2 PWA Nellcor or Masimo. The analog signals are analyzed on the SpO2 PWA. The results are digitized and sent to the Main Board via optocouplers. The couplers provide patient isolation as well as serial data interface. A reset signal to the SpO2 PWA is also provided so that power up sequencing is correct. If the SpO2 circuit quits communicating to the Main Board, the Main Board will attempt to reset the SpO2 PWA. Cuff Blood Pressure BP and Pulse The BP parameter in the ProCare Monitor is available with two types of DINAM AP BP technologies on a calibrated to intraarterial pressure and one calibrated to the auscultatory method specific technologies are available in select markets. All user interface options, instructions for use, and alarms will be the same for both technologies. The BP parameter is included in all modes. Blood pressure is monitored noninvasively in the ProCare Monitor by oscillometric method. NOTE For neonatal populations, the reference is always the intraarterial pressure monitoring method. When the cuff and hose are attached to the ProCare Monitor and a Noninvasive Blood Pressure NI BP determination is initiated, the pump inflates the cuff. Pressure transducers PT1 and PT2 monitor pressure information. The pneumatic manifold has one valve, which is used to deflate the cuff.

Valve control is through the Main Board. The results are then displayed on the UI Board and sent to the printer if specified. The secondary processor monitors pressure information from PT2. If an overinflation condition occurs, the OVERPRESSURE signal is routed to the PVM to release the air pressure. The Main Board also generates an alarm condition with the speaker sounding an error code message on the UI Board. Principles of Noninvasive Blood Pressure Determination The oscillometric method of determining NIBP is accomplished by a sensitive transducer, which measures cuff pressure and minute pressure oscillations within the cuff. After inflating the cuff, the Monitor begins to deflate it and measures systolic pressure, mean arterial pressure, and diastolic pressure. When the diastolic pressure has been determined, the Monitor finishes deflating the cuff and updates the screen. The Monitor deflates the cuff one step each time it detects two pulsations of relatively equal amplitude. The time between deflation steps depends on the frequency of these matched pulses pulse rate of the patient. However

er, if the NIBP Determination Sequence At each step the micro processor stores cuff pressure, the matched pulse amplitude, and the time between successive pulses. The stepped deflation and matched pulse detection continues until diastolic pressure is determined or total cuff pressure falls below 7 mm Hg. The Monitor then deflates the cuff to zero detected pressure, analyzes the stored data, and updates the screen. The operating cycle is composed of four parts inflation time, deflation time, evaluation time, and wait time. Wait time, which varies from mode to mode, is affected by the cycle time auto mode or operator intervention manual mode. The figure shows the basic operating cycle.

NIBP Operating Cycle The maximum pressure allowed in systolic search is limited by the normal range for cuff pressures. In any operating mode, if a patient's systolic pressure exceeds the inflation pressure, the parameter will begin a normal deflation sequence, detect the absence of a systolic value, stop deflation, reinflate to a cuff pressure higher than the initial inflation pressure, and resume the normal deflation sequence. In any operating mode, if a patient's systolic pressure exceeds the inflation pressure of the monitor, the Monitor will begin normal deflation sequence, detect the absence of a systolic value, stop deflation, reinflate to a higher than initial inflation pressure 290 mmHg maximum, and resume normal deflation sequence. This additional inflation will occur only once per determination. The reference blood pressures may be obtained by invasive pressure monitoring at the central aortic region or at the radial sites. The reference blood pressures may also be obtained by non-invasive methods like a auscultatory method using cuff and stethoscope. For neonatal populations, the reference is the invasive blood pressure obtained at the central aortic region. The heating function is controlled by the Main Board. The Turbo Temp probe also contains a thermistor that indicates the temperature. When the probe is attached to the temperature connector and patient, the signal generated by the thermistor is routed to the Main Board. The Main Board converts the thermistor signal along with status information i.e., ORAL or RECTAL probe indicators to a DIGITAL signal. The Main Board then processes the DIGITAL signal and displays the patient temperature on the UI Board and printer in Celsius or Fahrenheit.

Host Communication Port The Host Comm Port is used to interface the ProCare Monitor with other electronic devices a central nurses station or remote alarm device. Signals can be sent to the ProCare Monitor to initiate blood pressure determinations and other functions. Patient data can also be retrieved through this port. For further information, reference the DINAMAP Host Communication manual. **Functional Description** The following paragraphs provide the functional interface relationship. These assemblies are: Main Board PWA User Interface UI Board PWA. SPO2 PWA optional. Printer optional. Optical Switch optional Main Board PWA The ProCare Main Board is based on the Motorola MMC2107 integrated microprocessor. This microprocessor is the primary processor for the ProCare Monitor. It services and controls the Patient Parameter Interface PPI devices, printer, UI Board, Real Time Clock, audio circuit, and host communication. The secondary processor controls the watchdog, pneumatic safety interlock, timing check, primary processor reset, and power supply control. The secondary processor is powered at all times. Independent software in the primary and secondary processor periodically communicate when the software systems are operating properly. When either system stops processing or detects an error, it stops communicating with the other. Either system, upon detecting a failure, can assert a safe state he rein called FAILSAFE of the hardware. Alarm tone sounding from speaker. Pneumatic FAILSAFE deflate the cuff, pump off. Normal communications interface disabled. Remote alarm control inactive. The FAILSAFE condition will terminate automatically after 10 minutes to preserve battery power. All regulated DC power, isolated and non-isolated is generated on the Main Board from Battery supply.

The external DC input is used to charge the battery via charging circuitry on the Main Board.

User Interface UI Board PWA The UI Board is used as a message center. It displays patient vital signs, alarm status, monitor setup, limit violation, BP cycle and the time the data was received. The primary processor on the Main Board controls the UI Board. When the primary processor reads the parameter signals, it decodes the signals and routes the display information to the UI Board. The UI assembly also provides hard key switches for the ProCare Main Board. SPO2 PWA The ProCare Monitor can be configured for use with either a Nellcor or Masimo SPO2 PWA. The SPO2 PWA provides continuous readings of oxygen saturation and pulse rate. Additional circuitry on the Main Board provides power, data communications, and isolation between SPO2 PWA and primary processor. Patient data received from the finger sensor is filtered, amplified, and analyzed on the SPO2 PWA. The information is sent to the Main Board via the optically coupled electrically isolated serial connection. The primary processor receives the data and routes it to the UI board for display. The data is also sent to the printer if specified. The printer has a built-in sensor to monitor the printer paper presence. When the printer is out of paper, it sends a PAPER OUT signal to the primary processor. During normal operation the PVM is controlled by the primary processor. If a failsafe mode or overpressure condition occurs, the secondary processor provides the appropriate control signals to insure a safe condition, where the cuff vents to ambient atmosphere pressure. Optical Switch The optical switch indicates whether the temperature probe is inserted in the probe holder or not. The Main Board powers the switch.

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