Covidien Scd 700 Series Manual

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EN24 Section VIII Parts Listing.EN25 Section IX Specifications.EN26 Compression System. EN26 Section X Schematics.EN29 Figure 9 Parts Assembly Diagram Exploded view Page 1 of 2. EN29 Figure 9 Parts Assembly Diagram front enclosure Exploded view Page 2 of 2. EN31 Figure 11 Rear Enclosure View. EN32 Figure 12 Front Enclosure View. EN33 The System consists of the controller, the tubing sets provided with the controller and singlepatient use garments purchased separately from this controller. The garments, both leg sleeves and foot cuffs, compress the limbs to enhance venous blood movement. After the compression cycle has reached set pressure, the controller measures the time it takes for the limbs to refill with blood and waits that period of time before the next compression is initiated. Leg Compression The use of the Kendall SCD 700 series compression system with leg sleeves is indicated for 1. Deep vein thrombosis and pulmonary embolism prophylaxis. If you need further information regarding the Kendall SCD 700 series compression system or its clinical benefits, please contact your Covidien Sales Representative. Foot Compression The Kendall SCD 700 series compression system may not be recommended for use with foot cuffs on patients with the following 1. Conditions where an increase of fluid to the heart may be detrimental. 2. Congestive heart failure. 3. Preexisting deep vein thrombosis, thrombophlebitis or pulmonary

embolism. Use with caution on the infected or insensitive extremity. EN1 It is acceptable to service and repair the components identified as serviceable in this document. 5. Although training on the use of the device is recommended, no special skills are required. 6. WARNING Do not operate the controller if the power cord is damaged. 7. WARNING Do not attempt to repair or replace broken tubing connectors as hazardous inflation of the sleeves may occur. 8.http://healthmedico.com/userfiles/firex-smoke-alarm-model-g-6-manual.xml

WARNING To avoid the risk of electric shock, this equipment must only be connected to supply mains with protective earth. 9. WARNING Do not position the controller so that it is difficult to disconnect the power cord from the AC outlet. Explanation of Symbols Caution, consult accompanying documents. Not made with natural rubber latex. Consult instructions for use. Federal USA law restricts this device to sale by or on the order of a physician. Reorder number for the device located on the carton label. Use by Use By 0123 Controller Symbols CE Mark Batch Code Controller serial number Device has not been subjected to a steilization process. Manufacturing date code Keep away from sunlight. Keep dry. Type BF protection against electronic shock. 15% 85% Humidity limitations Manufacturer 4 F 20 C 131 F 55 C Store between these temperatures. WEEE Waste from electrical and electronic equipment Protection against fluid ingress spraying water Protective earth ground Protection against fluid ingress spraying water and particulates Equipotential ground point EN2. Single use device Do not use if package is opened or damaged. Tubing Set Symbols Device contains phthalates. Constructed from recyclable materials.This is done by grasping the device handle and the top portion of the pivoting bed hook and squeezing to open the gap. Place it on the foot board so it straddles the foot board and release the bed clamp. See the figure at right. Ensure its security. Alternatively, the device can be placed on a horizontal surface appropriate for the environment, such as on a table, within reasonable proximity to the point of use. Be sure to allow adequate air flow to the vents located at the power cord cover and below the tube set connection points. The controller can operate with one or two garments attached to the patient. Plug the tubing sets into the back of the controller. Route the tubing toward the patient s limbs, being careful to leave access ways clear and eliminate tripping hazards.

Plug the tubes into garments wrapped onto the patient s limbs. Match the left and right ports, marked B and A respectively, with the left and right limbs of the patient. Although the operation of the controller is not affected, troubleshooting can be easier. Check tubing sets for kinking and secure attachment at the controller and the garments. Plug the controller power cord into a properly grounded hospital grade receptacle. The blue AC Power Indicator will illuminate. If no AC Power is accessible, the controller can be run using its own internal battery power. If compliance monitoring is desired, refer to Section II. If using leg sleeves, no further user intervention is required unless there is a fault condition detected or if therapy must be discontinued. The controller will beep, flash all the LED s and illuminate the display screen. Quick internal device checks are performed, which may be audible to the user. The pump will begin to operate as part of the Garment Selection and Verification procedure. Detection of inoperative LED s, display screen and the audible error indication function at startup is the user s responsibility. Garment Selection and Verification After startup, the Garment Configuration procedure allows the user to select when foot compression is required at either of the two controller ports On the display, the Port A Leg and Port B Leg images blink to indicate the default garment configuration leg compression. Pressing either the A or B Button will cause the corresponding port s leg image to shift to a foot image to signify foot compression. The buttons must be pressed for each port that is connected to a foot cuff to turn on the corresponding foot images. Note Leg sleeve compression is the default configuration when the controller is first powered on. Therefore, the A and B Buttons do not have to be pressed to begin compression therapy when leg sleeves are being used.

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The A and B buttons need to be pressed only when foot compression is to be used. NOTE If a garment is attached anytime after the Garment Detection procedure has started, the system must be restarted to ensure that the proper therapy will be applied to the limbs. Also after startup, the controller immediately begins conducting the Garment Selection and Verification procedure at each port to determine if the garments have been properly attached to the controller Bed Foot Board EN4 If the controller senses a properly attached garment and the type of garment detected matches the Userselected garment or the default configuration, then the corresponding image of a Leg Sleeve or Foot Cuff for both the A or B side will be displayed on the screen. If the controller senses a properly attached garment but the type of garment detected does not match the Userselected garment or the default configuration, then a Garment Mismatch error is triggered. Garment Mismatch errors can be corrected by pushing the corresponding A and B buttons to change the Userselected garment type Leg or Foot. In the example below, the screen shows Foot Cuffs and indicates the user must press both A and B buttons FIGURE 1. A B FIGURE 1 Once the Garment Detection procedure is completed and any garment mismatch errors are addressed, the A and B buttons will be disabled and normal operation begins by starting the compression therapy. If only one controller port is connected to a garment for singlelimb compression, then the Userselected garment or the default configuration setting Leg or Foot for the open port will be ignored and both the leg and foot will be grayed out such as the example shown below FIGURE 2. A B FIGURE 2 If any garments are not properly detected or if no garments are attached to the controller, the system will trigger an E12 error. See section IV Fault Conditions and Troubleshooting in this manual. Check the garment application and tubing connections.

In this case, either the system can be turned off and restarted or the corresponding A and B Buttons can be pressed to confirm problem resolution and operation will continue without having to power the controller down and restarting. EN5 The controller automatically begins the process of applying intermittent compression alternating between limbs or to one if only one garment is applied. On successive cycles, the controller automatically adjusts its operating parameters to maintain set pressure. The pressure setting depends on the type of garment 45 mmhg for Leg Sleeves; 130 mmhg for Foot Cuffs. Vascular Refill Detection The Kendall SCD 700 series compression system incorporates Covidien s patented Vascular Refill Detection method to customize the therapy for each patient s physiology. This system measures the time it takes for the veins in the limb to refill after having been compressed by the system. The time is then used in subsequent cycles as the time between compressions. Vascular Refill Detection occurs automatically and requires no operator interaction. The Vascular Refill Detection method is used when first powering on the System after it reaches set pressure and every thirty minutes thereafter. During the entire time Vascular Refill Detection is in progress, a rotating ring symbol will display in the center of the screen as shown below in Figure 3. This symbol is informative only. No action is required by the user dring the Vascular Refill Detection Process. The method works best when the patient is still, however it will accommodate movement. If an error is detected during any measurement or if the compression is not within the System pressure specifications, the refill time measurement will be repeated after the next compression cycle. The time between compressions on the same limb will never be shorter than twenty seconds or longer than sixty seconds.

If both controller ports are being used, then the longer of the two measurements will be used to adjust the time between cycles.Tubing Set Compatibility The garments connect to the controller via the Tubing Sets provided with the controller. Additional or replacement Tubing Sets are available as Reorder Code The Extension Tubing Sets are also available as Reorder Code EN7 This unique feature operates in the background, so that it does not interrupt daily normal operation. The

denominator bottom number is the elapsed time since the last Compliance Meter reset or can be chosen to show a moving window of time, such as a nurse shift. The numerator top number is the patient therapy time. It is the amount of time that compression therapy was applied to the patient during the elapsed period of time specified in the denominator. The time is expressed in hours and minutes. Any time the controller is turned off or an error condition is present, thus halting normal operation, the therapy time numerator will not increment, but the elapsed time will increment. The maximum amount of time that can be displayed is 999 hours. After the controller is off for 40 days continuously, the Compliance Meter will reset to zero. The Compliance Meter features are shown below Therapy time top number HHHMM FIGURE 4 Elapsed time bottom number HHHMM Right arrow button A button shift selector Shift selections Selection Indicator Reset icon B button reset button Resetting the Compliance Meter The Compliance Meter can be accessed when the controller is on and is delivering therapy. The controller will sound a deny tone, three quick beeps, at any other time such as immediately after turning the system on and garment detection is in progress garments blinking. Note use of the Compliance Meter does not halt or otherwise affect the ongoing compression therapy. Reset the Compliance Meter to zero Access the Compliance Meter by pressing the Right Arrow button.

Pressing it again will return the user to normal operating mode. If the Compliance Meter is accessed, but no further action is taken, then the system will change the display back to normal operation mode in thirty seconds. Reset the Compliance Meter by pressing the B button. The confirmation screen will appear as shown in the figure below Figure 5. Press the A button to select check mark to confirm the reset operation. To decline the reset, press the B button. After either A or B is pressed, the screen will revert to the Compliance Meter Screen. Reset icon Confirm reset Deny reset FIGURE 5 EN8 The system will begin recording time starting from zero. If a reset is not initiated, then the Compliance Meter continues its operation. This may result in inaccurate compliance information for the patient. It is not recommended to reset the meter again until the device is assigned to a new patient. Accessing the Compliance Meter At any time during the use of the device, compliance to the therapy can be checked. This will not interrupt therapy. Press the Right Arrow Button. A screen similar to Figure 4 will be displayed. The top number shown in the middle of the screen is the number of hours of Compliance that occurred during the period of time shown in the bottom number elapsed time. Pressing the A button shift selector allows the user to select a time duration of interest. Note that the selection indicator moves with each button press. To determine the amount of therapy a patient has received over the most recent 8 hours, for example, select the 8 on the shift selector. To determine the amount of therapy a patient received over the most recent 24 hours, for example, select the 24 on the shift selector. Be aware, if the amount of elapsed time has not yet reached the time selected on the shift selector, then the actual elapsed time will display in the bottom number. Note that after 30 seconds of inactivity, the Compliance Meter will return to the normal therapy screen.

EN9 This indicates how much therapy since the last system reset. EN10 There are three Battery Status Indicator LED s used to represent the charge level of the battery. Once the controller is powered on, it may take the system a few seconds to establish communication with the battery and display the charge level. The battery Indicator shown below is located in the upper right hand corner of the user interface. See FIGURE 6. Warning If the ground integrity of the mains power cable is in question, the device should be operated on battery power until the ground integrity can be insured. FIGURE Battery Status Indicators Unit plugged in and Powered On Charging Battery State Battery Status 1 Battery Status 2 Battery Status 3 100% charge Green Green Green 6799% charge Green Green Green Pulsing 3466% charge Green Green Pulsing Off 033% charge Green Pulsing Off Off Unit not plugged in and Powered On Operating on Battery Battery State Battery Status 1 Battery Status 2 Battery Status % charge Green Green Green 3466% charge Green Green Off Once there is less than 15 minutes of battery charge left, the audible error indicator will sound continuously and

the dead battery icon will display as shown in FIGURE 7. FIGURE 7 Charging the Battery The battery will begin charging as soon as the unit is plugged into an AC power source. The amount of time required to charge the battery will vary depending on the battery s overall condition, age, and the controller s state during charging. For example, charging a new, fully drained battery will take approximately 4 hours with the controller on standby and 8 hours with the controller powered on. The Battery Status indicators should always be used to determine the state of charge for the battery. A fully charged battery will typically provide 68 hours of operation time depending on the sleeve configuration, sleeve application, and the battery condition.

Note If the operation time on battery power is extremely short the battery should be returned for service or replacement. Note The battery performance may be reduced if it is left unused for extended periods of time. It is recommended that the battery pack be stored with a minimum charge of 50% and kept near 25 C 77 F if prolonged storage is necessary. Battery Warnings The Kendall SCD 700 series compression system battery pack contains Lithium Ion LiIon battery cells and must be used properly for safety and to maintain optimal performance. Store spare battery packs between 20 C 4 F and 60 C 140 F. Do not drop, impact, or immerse in water. Do not touch or ingest any leaking electrolyte. If ingested, contact local poison control center. Do not open battery, dispose of in fire, or short circuit. Doing so may cause the battery to ignite, explode, leak, or become hot and cause personal injury. Dispose of improperly working or damaged battery packs according to local regulations. Charge only with specified chargers according to Covidien s instructions. EN12 If a Garment Mismatch error is triggered the user may remedy the problem by pressing the corresponding A and B Buttons. Some errors will remain active until the controller is turned off, or the battery runs out of charge if operating on battery power. Others can be reset once the user confirms the cause of the error and remedies the problem. Error Types Description Example Service Required Error code is present because of a failed internal component. It can not be addressed by the user. E5 Manual Reset Required Error that can be troubleshot and corrected by the user but requires the device to be powered off and on. If the error persists, then the controller requires service. E1 A B User Resettable This type of error allows the user to remedy the issue and resume operation by pressing the A and B buttons corresponding with the port affected without powering the unit down.

For this type of error, a check mark will be shown indicating what port is the area of concern. A yellow triangle indicates a low concern error. If the triangle is red it is indicative of an error related to a pressure that is high in an abnormal way. If the error persists, then the controller requires service.A System High Pressure Error E1 Manual Reset required System pressure has exceeded 90 mmhg Leg sleeve or 180 mmhg Foot Cuff. If the proper garment is selected and the problem persists have the controller serviced by a professional. Check for kinked tubes or patient interference with the garments, like pressing foot against foot board. High Pressure Leg Sleeves E2 User Resettable Leg Sleeve pressure is greater than 47 mmhg for 10 consecutive cycles; A B or pressure is above 65 mmhg for 5 consecutive cycles. High Pressure Foot Cuffs B User Resettable Foot Cuff pressure is greater than 135 mmhg for 10 consecutive cycles or pressure is above 160 mmhg for 5 consecutive cycles. E2 A Low Pressure Leg Sleeves User Resettable Leg Sleeve pressure is less than 43 mmhg for 10 consecutive cycles. Check for a tight leg sleeve and adjust fit appropriately. Also check for a partially occluded tube. Check for a tight foot cuff and adjust fit appropriately. Check for leaks in the sleeve or the tube connections. Low Pressure Foot Cuffs User Resettable Foot Cuff pressure is less than 125 mmhg after 10 consecutive cycles. Check for leaks in the cuff or the tube connections. EN14 Check for leaks in the sleeve or the tube connections. Low Pressure Foot Cuffs User Resettable Foot Cuff pressure is not between 110 and 150 mmhg for 12 consecutive cycles. E4 Check for leaks in the cuff or the tube connections. Valve Feedback Error Service Required If a valve electrically E5 malfunctions, this error will be displayed. Software Error E6 Service Required Upon startup, and periodically during operation the microprocessor performs diagnostic tests.

If a software error is detected, this Error Indicator will be triggered. Compressor Error Service Required If the compressor electrically malfunctions E7 this error will be displayed. Service Technician only Verify that the valve assembly wires are properly connected and confirm solenoid actuation. Return to Covidien for service. Service Technician only Verify that the compressor wires are properly connected. E8 A Vent Error User Resettable The pressure in a garment is greater than 20 mmhg at the end of any vent period. B Check tubing for kink or occlusion. Check garment application too loose or tight. Service Technician only Check for kinked internal tubing. EN15 Battery Error Service Required Safe battery operation of the controller can not be E10 ensured. High temperature Make sure the controller is not covered by bedding and that the fan port, located near the power cord is not obstructed. Low Temperature Allow the system to warm to room temperature. Service Technician Only Ensure that an unauthorized battery pack replacement has not been made. Replace pack or return to Covidien for service. E12 A Tubing Disconnect Error User Resettable Pressure measured in the inflatable garment is below 10 mmhg for 10 B consecutive cycles or no garments are detected during startup. Pressure Transducer Error E13 Service Required The system could not sense a pressure rise of more than 5 mmhg during an inflation cycle or during start up. Check for disconnected tube sets or garments and reconnect. Service Technician Only Check the transducer tube inside the controller and ensure it is neither kinked or disconnected. Low Battery Error Recharge Battery There is less than 15 minutes of battery charge remaining. The pump and valves will continue to operate for as long as there is enough power. Plug the controller into an AC power outlet.

Section V Service and Maintenance This service manual is intended for use as a guide to technically qualified personnel when evaluating System malfunctions. It is not to be construed as authorization to perform warranty repairs. Unauthorized service will void the warranty. Introduction The Kendall SCD 700 series controller contains no user serviceable parts. User maintenance is covered in the sections that follow. All other maintenance must be performed by technically qualified service personnel. EN16 If a controller is to be returned to Covidien for service, a description of the operating conditions and the fault code displayed should accompany the unit. The fault codes displayed by the controller are useful in diagnosing service problems. This manual describes service procedures to the circuit board level, with an exploded view of the controller shown in Figure 9. If a component failure on a circuit board is suspected, the unit should be returned for service. It is recommended that the system be returned with the circuit board in place, as removal of the boards involves additional risk of mechanical damage and damage from electrostatic discharge ESD. Warranty and Factory Service Covidien warrants that your Kendall SCD 700 series compression system is free from defective material and workmanship. Our obligation under this warranty is limited to the repair of controllers returned to a service center, transportation charges prepaid, within one year of delivery to the original purchaser. This warranty does not apply to the Tubing Set or the disposable garments, or to equipment damaged through shipping, tampering, negligence, or misuse, including liquid immersion, autoclaving, ETO sterilization, or the use of unapproved cleaning solutions.

To the extent permitted by applicable law, this limited warranty does not cover, and is intended to exclude, any and all liability on the part of the Company, whether under this limited warranty or any warranty implied by law, for any indirect or consequential damages for breach hereof or thereof. Except as expressly provided above in the limited warranty, to the extent permitted by applicable law, the Company hereby negates and disclaims all express and to the extent permitted by applicable law, implied warranties, including the warranties or merchantability and fitness for a particular purpose.Call one of the service centers listed. Obtain a return material authorization number and ship the controller, prepaid and insured in the original carton. Service Precautions Always unplug the controller from Mains voltage before servicing the controller. Use proper techniques such as grounding straps and pads to protect printed circuit board assemblies from ESD

Electrostatic Discharge. Fan Filter, Exhaust Filter and Ventilation CAUTION Unplug the controller before accessing the fan filter or exhaust filter. The fan filter and exhaust filter must be kept clean to ensure continued troublefree operation. The controller should never be run without the fan filter and exhaust filter in place. Clean or replace the filter when required. During system use, obstruction of the fan cover and vents should be avoided. Free flow of air is necessary to prevent overheating and premature component failure. EN17 Blown fuses should only be replaced by those indicated on the power supply board near the location of the fuses at the AC inlet. Use only 1.6 A, 250 VAC, 5x20mm Slo Blo fuses. If a fuse blows a second time, it should be presumed that the controller is defective and requires further service. Please contact your service center. Fuses are not accessible from the outside of the controller.

The fuses are located on the power supply board as part of the power inlet module under the fuse cover. Electrical Safety CAUTION Be sure the controller is disconnected from the AC power source before any disassembly. A potential SHOCK HAZARD exists when the front cover is removed even with the unit turned off. To facilitate electrical safety testing, the controller has an equipotential lug, located on the back of the device opposite the power cord. There are no other grounded exposed metal parts. Power cord resistance should not exceed 0.2 ohm. If ground resistance exceeds this value or the insulation integrity of the unit has been compromised through mechanical damage, the controller should be returned to a service center for testing and repair. Suggested Preventative Maintenance Schedule Proposed Maintenance After Any Repair Once Per Year Inspect and Clean Fan Filter and Exhaust Filter X As Required Verify Transducer Calibration Test Modes T3 and T4 X X Electrical Safety Tests X X General Function Test Test Mode T2 X The expected service life of the Kendall SCD 700 series controller is 5 years. However, the life of the controller can be extended indefinitely by replacing components if they fail. Refer to the spare parts listing within this Operation and Service Manual. Error History The Kendall SCD 700 series compression system stores the ten most recent error codes for use in troubleshooting devices returned from use. There is a test access mode, discussed later in this manual that describes exactly how to use the feature. Cleaning CONTROLLER CLEANING The controller enclosure can be cleaned with a soft cloth dampened with water or a mild detergent. To sanitize the device, apply cleaning agents with a cloth or wipe. Avoid excessive spraying, especially in the areas of the connection ports on the back of the device. If any liquid enters the ports, then internal component damage will likely result.